The Chemical Age

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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Welfare in Workshops

APART from its technical aspects, the annual report of the Chief Inspector of Factories and Workshops, which we briefly noticed last week, is an interesting study in the problems of works management and the tactful handling of workpeople. Those who have had experience of labour disputes know that generally the personal element counts for nearly as much as the economic. In some cases, indeed, it may count for more, for where wages and conditions are satisfactory one tactless or unsympathetic manager may neutralise the good effect that should result, and set everybody in a state of irritation and discontent. From this point of view it is encouraging to hear that the establishment of works committees has had an excellent influence in abolishing friction, in bringing the management and the operatives into closer touch, and in securing a happier and more human relationship between the employer and the employee. By such committees, not only may matters in dispute be discussed in a rational spirit by those affected on both sides, but even more important, they are a safeguard against the spirit of suspicion and misunderstanding out of which disputes generally arise. Business organisers are beginning to realise that it pays not only to take the workmen into their confidence on matters affecting the men's interests, but to invite them to offer suggestions, based on their own experience, for securing greater safety in operations or an increase of output. There is a fund of experience to be drawn upon in every workshop, and it is a pity it should be lost.

Another matter dealt with at length in the report is the increased provision against accident. Familiarity with machinery is apt to produce a spirit of contempt for danger, and a large proportion of the accidents that arise might be avoided by ordinary care. As an example of the indifference to danger that prevails it is stated that an inspector on visiting for the first time a new country sawmill noticed that unprotected shafting had been carried across the main department at a height of eighteen inches from the floor. When he entered the building the manager was conducting a party of ladies over the premises, and they each in turn stepped over the rapidly revolving shaft, apparently in entire ignorance of the risks they were running. Another authentic case, of a distinctly foolhardy type, is given in the report. The manager of a small flour mill, whose attention was directed by an inspector to the grave danger of an unprotected shaft protruding through a wall into a passage way and about three feet from the floor, contended that there was no danger with a smooth shaft and proceeded to lean against it. The inspector, while warning him of his danger, remarked that a tight coat such as he was wearing was certainly safer than anything loose which might lap, at which the manager, to show his incredulity of risk from what he considered a perfectly harmless shaft, doubled the tail of his white overall coat round the shaft before the Inspector could prevent him. The coat instantly caught, dragged the manager sharply against the shaft, pinned him there for a minute, then fortunately the coat tore, and he was able to pull himself free, a pale and very scared man, with presumably an increased respect for the Inspector. "This," the report states, "was a sharp lesson, and one not likely to be forgotten, but it is difficult, apparently, for anyone who has not actually seen or had authentic evidence of a shafting accident to realise how serious the risks are." The remedy lies in getting rid of the old idea that safeguards against accident are mere "fads," and that there is something manly in running unnecessary risks.

One of the most pleasant sections of the report is that recording the advances made in the hygienic conditions of workshops. It is true that some pretty bad conditions are disclosed, especially in the industrial districts of the North, but on the whole the tendency is distinctly in the right direction. Frequent lime-washing and painting are much more general than they were; increased attention is given to

ventilation, lighting and air space; in some cases dust produced in the course of mechanical operations is automatically extracted and carried into an outside receptacle; colour schemes are occasionally introduced to give an air of brightness to interiors, and the provision of facilities for washing tends to the promotion of cleanliness and health. All these things have an appreciable effect on the self-respect and efficiency of the workpeople, and are signs of progress towards the better organisation of industry. The inspectors have still to cope with a volume of stupidity and prejudice on the part of employers, who apparently think that the less workpeople are cared for the better for the firm. Their visits and advice, however, supported by an occasional resort to the courts in really bad cases, are steadily bearing fruit, and in this respect the services of women inspectors, who spot things that a mere man might miss, are proving of the highest value.

Working Hours and Output

THE Report indicates that now the average working week is reduced to 47 or 48 hours many alternative arrangements of the daily hours present themselves. The problem is to determine which system is conducive to the greatest output from the workers. In many chemical works the processes are continuous so that there is no alternative to the three-shift system of eight hours; but when night work does not enter the question it would seem that the manner in which the day is split up must largely depend upon local circumstances, the age of the worker, and the plant or machinery available. In some factories, *e.g.*, dyeing and bleaching works, the reduction in hours has been followed by the elimination of Saturday as a working day, an arrangement which has its merits in that the longer week-end, apart from the manner in which it is said to benefit the workers, provides an admirable opportunity for carrying out repairs to plant. The principle of making Saturday a regular holiday is gaining ground, mainly owing to the fact that on that day so few hours are normally worked that a man has really no time to settle down to his task before closing-hour arrives. A more recent argument put forward, in view of the ancrease in workmen's fares on all forms of conveyance, is that from the point of view of domestic economy it is preferable that ten journeys per week should be paid for rather than twelve. On the other hand, some of those who have experimented with the "Saturday off" system find that the week-end holiday, instead of stimulating the worker to greater effort, is responsible for a much more acute attack of what, in common parlance, is understood by the "Monday feeling."

The great endeavour, however, is to find a system which bears most notably on production, and to this end some 200 firms, employing 15,000 adults and 3,400 young persons, have put to trial a dual shift scheme which splits the day into two equal periods. Work commences at 6 a.m. and continues (with 30 minutes break) until 2 p.m., at which hour the second shift arrives and carries on until 10 p.m. Accordingly, the plant and machinery, instead of being idle for 16 hours a day, are kept in operation for 15 hours. Although, therefore, the wages bill may be doubled, there is no increase in capital charges; accordingly a greater output is obtained at a lower outlay per unit. Again, where production lags behind demand, the system provides—without payment of overtime—an effective means for wiping off arrears. There are, of course, the inevitable drawbacks to such a scheme. One is, for instance, inclined to ask how those classified as young persons are to provide for their attendance at evening schools. Of importance, too, is the question of staff, for whereas an employer may not hesitate to duplicate his workmen he will in all probability show little inclination to double his supervising department. The result may be, therefore, that while the workman gets a 7½ hour shift the manager will find himself doing 15 hours a day.

Dyestuffs from Germany

ATTENTION has been drawn during the past few days to the amount of dyestuffs imported into this country from Germany. The suggestion is that we are going back on our war-time pledges to have nothing to do in the way of business with Germans ever again. There is, of course, another aspect of the case. Under the Armistice terms we were entitled to a supply of German reparation dyestuffs, and presumably these are the imports now criticised. If their introduction into this country were part of a "dumping" policy to swamp the British market there might be some substance in the complaint, but as a matter of fact these dyestuffs are imported for our own convenience, and not for the convenience of the German colour makers. The same is true of Swiss and American imports. If we were in a position to supply all our own needs in the matter of dyestuffs probably a case might be made out for a complete prohibition of imports. But in spite of the progress we have made that position is still a long way off. In the meantime, what is to become of the textile and other industries which are dependent for their existence on an adequate supply of dyestuffs? Their needs can only be met in one way. They must rely on British produced dyestuffs as far as these are available, and the deficiency must be made good by the import of foreign dyestuffs. Even this policy is frankly protectionist in principle, and is open to the criticism which all protectionist measures are subject to, but we know of no protectionist authority who has ever advocated that we should refuse to admit into this country goods which are urgently required for British industry, and which our own manufacturers are not producing. Such a practice would be a blow not at the foreign competitor, but at our own trade. If we cannot get on without Swiss, American, Japanese, and German dyestuffs, obviously we must have them, as necessary contributions to our own industrial life. When we are in a position, if we ever are, completely to provide for ourselves, then we can decide whether foreign goods are to be allowed to come in at all, or on what conditions they can be admitted consistently with justice to British industry. Until then the same principle must be applied to dyestuffs on which we are dependent for industrial existence as to foodstuffs on which we are dependent for physical existence—what we cannot produce ourselves we must buy from others.

British Chemicals for Canada

AN interesting piece of news relating to an opening for British laboratory equipment, chemicals, &c., in connection with Canadian universities, is supplied by the Department of Overseas Trade. A letter was recently addressed by H.M. Trade Commissioner in Toronto to the professors at the Universities in Ontario, offering to place them in touch with United Kingdom manufacturers when in the market from time to time for equipment, chemicals, &c. The replies received were gratifying, and indicated a general desire on the part of the professors to make their purchases in the United Kingdom rather than in the United States. The following are the principal universities in the area affected :—

University of Toronto, Toronto, Ontario.
Queen's University, Kingston, Ontario.
Western University, London, Ontario.
McMaster University, Toronto, Ontario.

Considerable purchases were made in the United Kingdom before the war by the universities, but during the war and since much of the business has been obtained by the United States. During the past two years deliveries from the United Kingdom have not been satisfactory on account of post-war conditions, but as the deliveries are improving it should be possible for United Kingdom firms to regain a substantial share of the business if they keep in constant touch with the local buyers. One of the buyers has written the Trade Commissioner as follows: "As soon as we can depend on receiving goods within two months we shall resume our former practice of making purchases in England."

The Commissioner strongly advises United Kingdom manufacturers interested in the supply of the equipment and materials mentioned to correspond with the professors who are likely to require such goods. It is not enough to send one letter with catalogues and literature, and then to forget the local buyer. Regular correspondence, it is advised, should be maintained, and in addition to circular letters an occasional personal letter is desirable. In the opinion of the Commissioner, the products of United Kingdom firms should be constantly placed before local purchasers, as is being done by United States firms. The business in such a case may not be great, but if it is worth while for United States competitors to cater for it, it should be worth the while of British manufacturers.

Chemistry at Oxford

THREE Oxford professors—W. H. Perkin, Waynflete Professor of Chemistry; Frederick Soddy, Dr. Lee's Professor of Chemistry, and Benjamin Moore, Whitley Professor of Bio-Chemistry—make a spirited retort against the view that Oxford, essentially the home of the humanities, should leave science to the newer universities. They point out that the sum of a quarter of a million which is wanted for new buildings and equipment is not for applied science or to compete with specialised departments of other universities. It is required to enable Oxford to do its duty by those who are at present in residence for the purpose of being educated and fitted for their life work. Among the urgent needs is that of a new building for inorganic and physical chemistry. The present one has only provision in its main laboratories for 18 honours and 56 preliminary students working at a time, whereas there will, in the coming term, be some 300 honours students and probably 500 in all requiring accommodation and instruction in chemistry. In addition, a large extension to the existing building for organic chemistry is now in course of construction, and permanent quarters for bio-chemistry have to be provided. "We cannot believe," the three professors state, "that anyone with the welfare of the University at heart would willingly acquiesce in any compact which handed over to other universities the development of science. We venture to express the hope that the Commissioners will see to it that the very large body of undergraduates and graduates in science are more adequately provided for. The nation's need for more and better trained graduates and research workers in science was emphasised and endorsed by almost every responsible authority during the course of the war How they are to be supplied is one of the most urgent practical questions that still has to be solved. It is only the need of money that hinders Oxford now from taking its proper share in this necessary work."

The Calendar

Oct. 18	Physical Society of London and Faraday Society (Joint Meeting): "The Physics and Chemistry of Colloids."	London.
18	Royal Automobile Club: "Alcohol Motor Fuel," by Professor H. B. Dixon. 9 p.m.	Great Gallery, Pall Mall, London.
19	Hull Chemical and Engineering Society: "The Chemistry of Foods," by A. R. Tankard. 7.30 p.m.	The Metropole, West Street, Hull.
19	Institution of Petroleum Technologists: "Coal as a Future Source of Oil Fuel Supply," by Sir Arthur McD. Duckham. 5.30 p.m.	Royal Society of Arts, John Street, Adelphi, London.
20	Society of Chemical Industry (Newcastle Section): General Meeting. Address on "The Real Fuel Problem," by Dr. Paterson. 7.30 p.m.	Armstrong College, Newcastle-on-Tyne.
21	Manchester Municipal College of Techuology (Dept. of Applied Chemistry): "Filter Presses ('Chamber' and 'Frame' Types); their construction and use," by E. A. Alliott. 6.30 p.m.	Manchester.
28	Chemical Society: Fischer Memorial Lecture by Dr. M. O. Forster. 8 p.m.	Burlington House, Piccadilly, London
29	Chemical Industry Club: Annual General Meeting. 8 p.m.	2, Whitehall Court, London.
Nov. 6	Society of Chemical Industry (Manchester Section): "The Inorganic Constituents of Lancashire Coals," by F. S. Sinnatt; "A New Process for the Vulcanisation of Rubber," by S. J. Peachey and A. Skipsey. 7 p.m.	Grand Hotel, Manchester.

The Concentration of Sulphuric Acid

By S. J. Tungay

Mr. Tungay briefly describes the more important systems of concentration, and discusses their relative merits as regards durability, economy of working, fuel consumption, and general efficiency.

USERS of sulphuric acid for varying applications, have proved that there is increased need for a concentrated sulphuric acid of from 160 Tw. to 168 Tw. over the ordinary brown or chamber acid of anything from 105 Tw. to 120 Tw.

Whilst the ordinary chamber acid or vitriol is found to be sufficient for many industries, such as the manufacture of super-phosphate, sulphates of ammonia and alumina, the use of concentrated acid is now rapidly extending; and, indeed, for many applications such as the sulphonating processes, including the preparation and manufacture of explosives, anilines, dyes, &c., a highly concentrated sulphuric acid is an absolute necessity.

Formerly a good deal of concentration was effected in a very simple manner, by the use of shallow open lead pans, and where a concentration not exceeding 144° Tw. was required, it was found that this method was very economical (the actual loss of acid being only 0·01 per cent.), so that practically nothing else than water vapour was given off during the process.

Sulphuric acid, however, of only 144 Tw., is not nearly high enough in strength for many applications, hence more efficient and more appropriate systems have been thought out and adopted, and the question of recovery of the released acid vapours which are given off at the higher temperatures has required much consideration.

Development of Plant

In connection with the production of sulphuric acid, more patents have probably been taken out dealing with its concentration, than with any other detail of the manufacture.

From the earlier methods of concentration in lead pans, fired either by waste heat or heated by steam, many different systems have from time to time received attention, such as platinum vessels, glass retorts, porcelain dishes, silica or quartz basins, cast iron vessels, either plain or lined with enamel, and vessels made of acid resisting irons. Alternatively the concentration by direct contact of acid with hot fire gases has been favoured by many.

Of all the many systems from time to time tried, only a few are now generally adopted by large works as a result of their durability, economy, low fuel consumption, and reasonable safety and general efficiency.

Each of these points require consideration in order to decide upon the type of sulphuric acid concentration plant to be laid down in any given case.

The enormously increased demand for sulphuric acid of high concentration in this country during the period of the war, afforded our chemical engineers an opportunity of showing what could be done in this direction. Anyone who has taken the trouble to carefully peruse the data embodied in the Reports on Efficiency for H.M. Explosives Factories, cannot fail to remark upon the degree of efficiency attained in connection with sulphuric acid concentration plant. It is doubtful if any other country could have excelled or even equalled the work done in this respect.

The two outstanding methods of concentration now remaining after severe tests, are the Cascade type, where concentration proceeds by the evaporation of the water content, and the Tower type, including the Gaillard and Kessler systems or modifications of these, both the latter systems being a direct contact of the liquid acid with fire gases, on the counter-current method, the principle of action being the absorption of the water vapour from the acid by means of superheated air or fire gas.

Each of the two methods (for simplicity we may term them "evaporation" and "absorption" systems) has certain points to recommend it, but the advantages or disadvantages of each system should be considered by anyone contemplating an installation of sulphuric concentration

A cascade system will produce a concentrated acid of 97 to 98 per cent., and give a clean white acid, providing it is a well designed and constructed plant, starting with a chamber acid of 63 to 64 per cent.

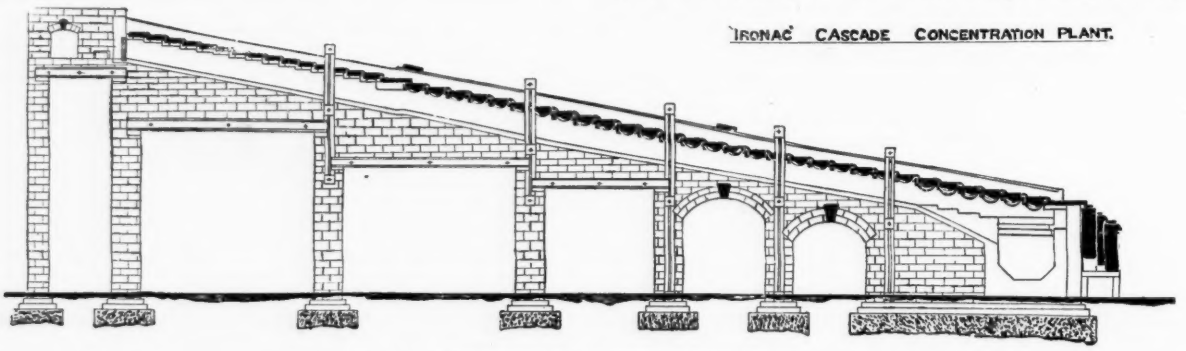

FIG. 1.—SULPHURIC ACID CONCENTRATION PLANT.
Cascade System—"Ironac" Vessels.

For an acid of this high concentration, 16 to 20 per cent. of fuel is required to be expended compared with the weight of the finished acid.

If, however, an acid of only 96 per cent. is required, with careful design these evaporation systems of cascades can be arranged to work with a fuel consumption as low as 13 to 15 per cent. of the weight of finished acid. The labour costs are low, and the loss of acid by evaporation compares favourably with the other systems.

Considerations of Space

The floor space occupied by such plant is considerable where very large quantities of acid per day are to be dealt with but for small outputs varying from 5 tons to 25 tons of concentrated acid per day, this system is on the whole a highly satisfactory one, and can scarcely be improved upon.

The following illustration gives a general arrangement of one of the latest types of cascade concentrators using "Ironac" metal vessels. (Fig. 1.) The cold dilute acid being preheated in shallow trays, the final concentration being effected in a series of cascade basins of about 12 in. diameter, so arranged that the acid flows by gravity throughout the concentrator. The acid is then cooled in specially arranged coolers on the outside of the plant.

In cases where large quantities of acid have to be dealt with daily, there is a distinct advantage in using one of the tower systems or absorption type of plant, such as the Gaillard or Kessler principle of concentrator.

In the Gaillard tower, the dilute acid being sprayed in the top of a tall tower, meets in its descent a counter-current of producer gas.

This can hardly be said to be so efficient a method for dealing with small quantities of acid, but it has been installed in a great many cases where continued large quantities are required.

These plants will deal with very large quantities of acid per day, each unit being made of as large as 30 tons or more capacity per 24 hours. Some of the Gaillard tower installations during the war have been constructed of very much larger capacity.

Unfortunately the cost of construction of the Gaillard tower plant is a somewhat heavy item, and as these are constructed to a height of 40 ft. to 50 ft., considerable headroom is needed, involving lofty buildings.

of fuel, and whilst producing 92 to 93 per cent. sulphuric acid, a consumption of only 7 to 8 per cent. of fuel is required.

In some of the older types of the Kessler plant it was found difficult to obtain a white acid, the acid being often discoloured to a dark brown, owing to contact with the fire gases, particularly where bituminous fuel or coke was employed. The writer has, however, a sample of 98 per cent. H_2SO_4 produced by one of the Duron concentrators, which is absolutely water white and colourless.

With the last two named systems, a more efficient form of scrubber is required for dealing with the waste gases carried away from the plant, as owing to the very much higher temperature, and the fact of the acid being in direct contact with

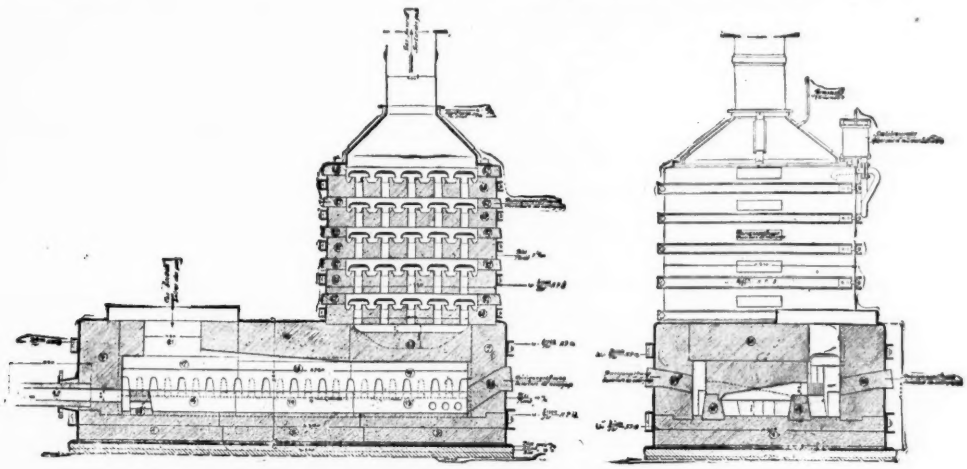

FIG. 2.—SULPHURIC ACID CONCENTRATION PLANT.
Duron Type (Kessler System).

A secondary tower, or recuperator, is a necessity in this plant, owing to the large quantity of liquid acid carried off in the form of a fine spray from the main tower. After passing through the recuperator, the fumes require treatment through a properly constructed condenser scrubber. For satisfactory construction of the tower, volvic lava rings and blocks are necessary.

Packed or Empty Towers?

There is much contention as to the advisability of using empty towers such as advocated by Gaillard, many authorities being of the opinion that more satisfactory results would be obtainable if the towers were packed or partially packed with a properly arranged packing or filling, consisting of cells of some description, giving a large scrubbing area.

From statistical reports, published by Government departments, it would seem that the cost of maintenance of Gaillard tower concentrators, as well as the consumption of fuel, in most cases exceeded the costs in connection with the alternate type of tower system—*i.e.*, concentrators constructed on the Kessler principle.

The following gives an illustration of the Duron type of concentrator, which is an improvement on the Kessler system. (Fig. 2.) The preheating of the dilute acid takes place in the recuperator tower or upper part of the plant, descending by gravity, and overflowing through callottes, it comes into contact with the escaping hot gases from the plant.

The actual concentration takes place in the saturex, or lower part of the plant, where the acid is in contact with the furnace gases coming over at an extremely high temperature from the generators which are adjacent to this part of the plant.

The acid in the saturex being subjected to these high temperature gases, the water is evolved in the form of a vapour which is absorbed by, and carried away with the heated gases.

A large number of these installations are working; and, providing they are well constructed, they show a remarkably high efficiency.

A plant of this type concentrating 97 to 98 per cent. sulphuric acid, shows a consumption of only 14 to 16 per cent. fire gas, a larger percentage of H_2SO_4 is carried away to be recovered in the scrubbers and condensers.

These last-named types of plant are also more expensive in construction as regards first cost, but do not occupy nearly so much ground space proportionately as would be occupied by a cascade system, if used for very large daily output of acid.

Carbide in Australia

DURING the six months ended 30th June last 50,168 cwt. of foreign carbide, valued at £68,155, was imported into Australia. This foreign product is being "dumped" into the Commonwealth, says *Industrial Australian*, with the object of smashing the carbide industry in Tasmania, which has been established at great expense.

The Federal Government knows that "dumping" in this particular commodity is being practised, but it seems disinclined to take steps to protect the local industry. The Minister of Customs explained recently that the Government was averse to the application of import prohibition orders and until the Tariff Bill containing specific provisions to meet "dumping" was passed, the only protection that could be afforded the industry was through the tariff, which had been increased. In view of the seriousness of the position, however, and the possibility of the Tasmanian works being closed down by the foreigner, the Government should not hesitate to exercise any power it possesses to maintain what is undoubtedly an important industry. Appended are details concerning carbide imports during the six months :—

Country of origin.	Quantity.	Value.
Canada	6,479 cwt.	... £6,128
Japan	318 ,,	... 1,206
Norway	33,848 ,,	... 48,968
Sweden	7,630 ,,	... 9,895
U.S.A.	1,893 ,,	... 1,958
Total	50,168 cwt.	... £68,155

U.S. Progress in Coal Tar Chemicals

Increased Output of Intermediates

DR. GRINNELL JONES, chief chemist to the United States Tariff Commission, has for some time been making a special study of the United States coal-tar chemical industry with special reference to the production of dyestuffs. In the current number of *Drug and Chemical Markets* he reviews the progress made during 1919.

The Geological Survey (he writes) has recently reported that the production of by-product coke and the by-products obtained therefrom during 1919 shows a slight decrease, as compared with 1918. This was due to labour troubles in the steel and coal mining industries and to railroad congestion. There appears to have been a small decrease in the amount of tar distilled, and a large decrease in the output of pure benzol, and especially of pure toluol. This means that a much larger proportion of the output was sold as mixtures for solvent purposes or as a motor spirit instead of in the purified condition. Of mere significance in considering the future of the coal-tar chemical industry is the fact that the productive capacity of the by-product coke ovens in the United States increased 17·2 per cent. during 1919. There is no question that, with the possible exception of anthracene, adequate supplies of the fundamantal raw materials of coal-tar origin will be available from American sources for the growth of the industry.

Output of Anthracene

In the case of anthracene considerable progress has been made during the past year, but the problem of securing adequate supplies is still unsolved. In 1918, the anthracene content of the crude anthracene produced was about a quarter million pounds, but very little of this was refined. In 1919 the output of crude anthracene was about three times the 1918 record, and a much larger fraction of it was refined than in 1918. Although this shows great and encouraging progress, nevertheless a much greater increase in output must be secured before there will be enough American anthracene available to supply the American demand for alizarin and vat dyes. It may be roughly estimated that the 1919 production of crude anthracene contained less than one-fifth of the amount of anthracene which would be required to supply the American needs. The fundamental difficulty is not primarily an actual lack of anthracene in the tar or purely technical difficulties in its recovery, but rather the fact that its removal leaves the pitch so hard that it does not find a ready market under American conditions. In England and Germany large amounts of hard pitch were used for the briquetting of coal dust and coke breeze, but this industry is very little developed in the United States. Any method of recovering anthracene which seriously disturbs the marketability of the other larger fractions of the tar, especially the pitch, would make the anthracene so expensive that the dyes derived therefrom could not be made on a competitive basis.

Research Work in Progress

This problem of securing supplies of anhracene adequate in amount, and at a cost which is not prohibitive, is perhaps the most important and most fundamental problem still awaiting solution in this industry. Whether it will be solved by the tar distillers or by the development of a synthetic process for making anthracene or anthraquinone cannot be determined at the present time. Active work on this problem along both lines is now under way, and the progress already made is encouraging.

As was to have been expected, there was a large decrease in the output of several intermediates needed primarily for explosives. This is most noticeable in the case of phenol, which showed an enormous production—106,000 lbs.—in 1918, but fell to less than one and one-half million lbs. in 1919, nearly all of this being obtained from coal tar. A less conspicuous case is the decrease in the output of monochlorbenzol from 20·5 million lbs. in 1918, to a little more than 4 million lbs. in 1919. There was also a considerable decrease in the output of several intermediates required for making dyes used for army uniforms ; for example, there was a 25 per cent. decrease in the output of m-toluylene diamin, which was used for making a khaki dye for cotton uniforms and a 90 per cent. decrease in metranitranilin, which was used for making a khaki dye for wool uniforms. These examples mean merely that chemical skill and chemical materials were no longer needed to make explosives or other military supplies, and henceforth could be devoted to our peace industries. It is my purpose to give some typical examples of the progress of the American coal tar chemical industry, under peace conditions.

Making New Intermediates

A comparison of the intermediates produced in 1918 and 1919 shows a considerable increase in the number of intermediates and substantial increases in amount in many cases. In 1919 there were about 225 different intermediates produced against about 140 in 1918. The new intermediates are, of course, comparatively difficult to make, but were needed for dyes and medicinals of the better class. Among these new intermediates may be mentioned brombenzol, dibenzylanilin, dichloranilin, nine new sulphonic acid derivatives of naphthol or napthylamin betaoxynaphthoic acid, and five new anthraquinone deriatives.

As a rule the intermediates for which there is the largest demand and whose manufacture had been well established by 1918 show comparatively little change in 1919. Thus, nitrobenzol gained 11 per cent. ; the 1919 output amounting to about 42·5 million lbs.; the output of aniline was about 2·45 million lbs. a gain of 1 per cent. ; paranitranilin, with an output of about 1,300,000 lbs., lost 1 per cent., and betanaphthol, with an output of about 5 million lbs., dropped 6 per cent. The output of H acid increased from a little less than 3 million lbs. in 1918, to about 4 million in 1919 ; on the other hand, the output of dimethylanilin fell off about 15 per cent., amounting to 3·5 million lbs.

Production of Leading Products

There are many notable increases in the output of individual intermediates, especially noticeable in the case of intermediates derived from toluol or from anthracene. The output of U.S. P. benzoic acid increased from about 173,000 lbs. in 1918, to over 600,000 lbs. in 1919, with a drop in valuation from $3·07 to 74 cents per lb. Orthotoluidin increased from 639,000 per lb. to a little over a million lbs., and para-toluidin, from about 200,000 lbs. to over 575,000 lbs. with a drop in valuation per lb. to nearly half the 1918 figures. The general increases in the output of intermediates derived from toluol is, of course, due to the relaxation of the restriction in the use of toluol during war time.

There are also many examples of a big increase in the production of intermediates which are difficult to make, but are required for dyes of the best quality. A good example of this kind is amidonaphthol sulphonic acid 2:8:6 (Gamma Acid) which was made in 1918 by a single firm, but in 1919 by five firms, with an output of over 155,000 lbs., valued at $667,000, which is many times the 1918 output. These five firms used this gamma acid to make nearly a half million lbs. of Oxamine Black—an important direct black which can be developed. Moreover, Gamma acid also went into Diamine fast red F, neutral gray G, and Columbia black FB—all of them important direct cotton dyes of faster type.

Other intermediates, whose output increased substantially include metanilic acid with an output during 1919 of 450,000lbs. ethylbenzylanilin, which served for the manufacture of acid violet ; Michlers ketone (260,000 lbs.) used mainly for the important dye Auramine ; thiocarbanilid (2,250,000 lbs.) used as an accelerator for vulcanising rubber ; naphthylamin sulphonic acid 1:5 and 1:9 ; and amidonaphthol sulphonic 1:2:4 (about 900,000 lbs.), important naphthaline derivatives.

Anthracene Derivatives

The progress among the anthracene derivatives is of especial interest. Here, unfortunately, definite figures cannot be given without revealing confidential information. In 1919 there were ten intermediates derived from anthracene, against only five in 1918. The output of anthraquinone, which is the most important because it serves as raw material for the manufacture of nearly all other intermediates derived from anthracene, was about ten times as great in 1919 as in 1918.

The total output of all dyes increased about 8 per cent. over 1918, or to a little more than 63,000,000 pounds valued at about $67,000,000. The average value per pound was $1·07,

which is just the same as shown by the 1918 census. The average quality of the dyes has, however, improved considerably, due to a partial replacement of many of the cheaper dyes by others of a more satisfactory character. The consumer accordingly, received better value for his money in 1919 than in 1918.

The production of basic dyes for 1919 was over 4 million lbs., an increase of more than a million lbs., as compared with 1918. The production of magenta, Victoria blue, malachite green and Bismarck brown more than doubled, while auramine nearly trebled. There has been a conspicuous increase in the production of rhodamine B.

Direct Dyes

The production of direct dyes was about 14·5 million lbs.. an increase of 2 million lbs., as compared with 1918. About half of this total was direct deep black EW. Conspicuous changes include large increases in the output of chysophenine, primu line, oxamine black, diamine rose, and the first appearance of diamine fast red F.

The production of mordant dyes during 1919 was over 3,100,000 lbs., which is about 2,300,000 lbs. less than the output of mordant dyes in 1918. This decrease is due principally to a diminished production of alizarin yellow GG and R of more than 2 million lbs. Mordant dyes available in 1919 in considerable, although inadequate, amounts, included alizarin saphirole, and other alizarin derivatives, as well as a considerable number of fast mordant dyes for wool dyeing and mordant printing.

The production of acid dyes for 1919 was over 14 million lbs., an increase of about 6 million lbs. over 1918.

Indigo

The production of indigo, 20 per cent. paste, reached 8,863,824 lbs., valued at $5,233,719. This exceeded the 1914 importation by 356,465 lbs., and the 1918 production by 5,779,936 lbs. Several indigo derivatives were placed on the market. Four other vat dyes were made on a commercial scale during 1919, but the output was only a small fraction of the pre-war consumption. However, fundamental progress has been made in this important field.

The total production of sulphur colours for 1919 was over 17 million lbs. This was about 6 million lbs. less than that for 1918. This was largely due to a decrease of about 8 million lbs. of sulphur olive and khaki dyes required in the war period for cotton uniform cloths. Sulphur black production in 1919 (14,260,000 lbs.) was about 2 million lbs. more than that for 1918.

Among the coal tar medicinals there has been a substantial increase in the output of many items already well established in 1918, including aspirin, acetphenetidin, arsphenamine, guaiacol, and methyl salicylate. Moreover, a considerable number of new products have been introduced on a small scale.

In the case of photographic developers of coal-tar origin, there was a decrease of 30 per cent. in the output of hydroquinone—to about 200,000 lbs. valued at nearly half a million dollars. On the other hand, the output of metol increased more than five times—to nearly 60,000 lbs., and para-amidophenol increased to about 7 per cent.—or to over 130,000 lbs.

The many difficult problems in readjustment from war conditions to peace conditions have been met with encouraging success. The achievements of American chemists in these industries furnish an excellent basis for optimism as to the future.

Successful Production of Steel

"THE Essential Elements governing the Successful Production of Steel," was the subject of the first of a series of lectures delivered under the auspices of the Sheffield and district section of the National Association of Industrial Chemists by Dr. F. Rogers, at the Secondary School, Leopold Street, on Friday, October 1. Dr. Rogers dealt with the practical application of metallography, and emphasised the fact that the principal properties of the metals were essentially crystalline in heat; that the alloys must be regarded as solutions, and that in exceptional cases amorphous properties existed. The fundamental influences of temperature upon steels, and the best methods of measuring and controlling these temperatures were also fully explained.

The Physics and Chemistry of Colloids

Important Conference in London

WHAT promises to be one of the most interesting chemical conferences of the autumn season is that on "The Physics and Chemistry of Colloids and their Bearing on Industrial Questions," which is being convened jointly by the Faraday Society and the Physical Society of London for Monday, October 25, in the hall of the Institution of Mechanical Engineers, Storey's Gate, S.W. 1. Sir Robert Hadfield, president of the Faraday Society, will take the chair, and Professor Sir William Bragg, President of the Physical Society of London, will preside over the discussions.

The afternoon session, which will last from 2.30 to 4, will be opened by a short survey of the physics and chemistry of colloids by Professor The Svedberg of the University of Upsala. This will be followed by a discussion on "Emulsions and Emulsification," to be opened by Professor Donnan, and continued with Papers by Mr. W. Clayton on "Emulsion Problems in Margarine Manufacture," and Mr. S. S. Bhatuagar, on "Reversal of Phases in Emulsions and Precipitation of Suspensoids by Electrolysis—an Analogy."

The second session (4.30 to 6.15) will be occupied with a discussion on "Physical Properties of Elastic Gels," to be opened by Mr. E. Hatschek and Professor H. R. Proctor, and continued with papers by Mr. S. C. Bradford on "The Reversible Sol-gel Transformation," and Dr. J. O. W. Barratt on "The Structure of Gels." The second subject for discussion is "Glass and Pyrosols," to be opened by Sir Herbert Jackson.

The evening session (8 to 10) will include a discussion of three aspects of the subject. "Non-aqueous Systems" will be dealt with first under the heads of "Nitrocellulose" and "Rubber." Sir Robert Robertson will open the discussion and papers will be read by Mr. F. Sproxton on "Non-aqueous Colloid Systems, with Special Reference to Nitrocellulose," and Dr. Guy Barr and Mr. L. L. Bircumshaw on "The Viscosity of Some Cellulose Acetate Solutions." Afterwards Mr. B. D. Porritt will open a discussion on "The Action of Light on Rubber." The subject of "Precipitation in Disperse Systems" will be opened by Dr. R. C. Tolman and Dr. R. S. Willows, and papers will follow by Mr. J. N. Mukherjee on "The Origin of the Charge of a Colloidal Particle and its Neutralisation by Electrolytes," and Mr. W. Clayton on "Coagulation of Inorganic Suspensions by Emulsions." The final subject for discussion is "Cataphoresis and Electro-endosmose." Professor A. W. Porter will open the discussion and Dr. W. R. Ormandy will read a paper on "Some Practical Applications of Electro-endosmose and Cataphoresis."

We are asked to say that contributions to the discussion are invited from members unable to attend the meeting. Tea will be served between the first and second sessions, and, between the second and third, arrangements have been made for a dinner at the Hotel Victoria, Northumberland Avenue. The arrangements are in charge of Mr. F. S. Spiers, The Faraday Society, 10, Essex Street, Strand, W.C. 2.

Power Alcohol

SOME interesting facts in regard to a substitute for petrol made with alcohol distilled from molasses have been published by the Cuban Secretary of Agriculture from information which is based upon a report to the Planters' Association made by the Agricultural Company of Maui. A large portion of the molasses produced yearly in Cuba is now entirely wasted, only 60 per cent. of the total production in 1918, of approximately 150,000 tons, being used. The average price in 1918 was 35s. per ton. The Maui Company produces 350 gallons of alcohol daily, with only three men, and claims that a plant to produce 3,000 gallons per day would need no larger force. The alcohol, modified as a substitute for petrol, has already been produced in considerable quantities by the Maui Company, and has been submitted to a number of trials, all of which gave excellent results. It left no deposit of carbon, but cleaned the cylinders of the machines in which it was tried of the carbon left there by petrol. The machine ran with less vibration, with less lubrication, and at a higher uniform velocity with the same opening of the valve that obtained with petrol. The fuel consists of a mixture of 100 gallons of alcohol with 5 gallons of ether, 2 gallons of benzine and 1 gallon of pyridine.

London University of Science

Views of R. C. S. Old Students

AFTER an informal dinner at the Imperial College Union, Sir Richard Gregory took the chair at the re-union of old students of the Royal College of Science on Tuesday evening.

A warm *esprit* prevailed both at the dinner and the meeting afterward. Professor Hinchley, who seems to know everybody, with his usual thoroughness arranged parties of four with such precision and deftness that before the first course was served those who after many years had almost forgotten the names and faces of their collegiate colleagues, were once more as much at home and as keenly interested as though the intervening years had not existed.

The meeting opened with a few remarks by the President of the Old Students' Association, after which Professor J. C. Philip, secretary of the War Memorial Committee, made an announcement with regard to the progress made by that committee. He spoke of a big undertaking in a modest way. It had been decided to erect memorial tablets to the heroes of the three colleges, the cost of which would be approximately £500. No difficulty was experienced in obtaining the sum required for this object, but the second part of the committee's scheme was a much greater proposition. It was thought that the Imperial College should be in possession of a Sports Ground, which would place athletic facilities within reach of its students on a basis of equality with any university. For this purpose a 23-acre field was selected, and the sum required £12,000. That field became the possession of the College on September 30, and two games have already been played upon it last week by the City and Guilds and the R.C.S. The matter, however, is not yet settled, for a mortgage has still to be cleared off, and in this the Governors of the College have not been slow in doing their share. A pavilion is also required, so it will be seen there is plenty of scope for the generosity of old students who wish to contribute to this admirable form of war memorial. A friend of the College has promised a like amount for any contributions given by old students.

The Chairman pointed out that Professor Philip being secretary of the British Scientific Instrument Research Association he had every confidence in him for he knew so practical a man would be sure to attain his objective.

A University of Science

Mr. J. W. Williamson was then called upon to deliver an address upon the "Proposed University of Science and Technology. Can a Useful and Worthy University be Based on Pure and Applied Science?"

Such an argument as that presented by the speaker would undoubtedly raise the interest of industrial scientists. It was pointed out that by its Charter the College was bound to provide intellectual equipment for the man who would apply his knowledge to industry. But in industry as in other phases of life, it mattered not how efficient a student had become or what diploma he held, a degree from a university was considered the hall mark of proficiency, and that was the one thing necessary. The result was that young students entered upon their studies with one eye upon the scientific training they were receiving and one eye upon the University degree. There was strong reason why the status of a university should be conferred upon the College of Science, when instead of a diploma a degree could be given to all who qualified. There are universities abroad granting degrees in one faculty, and the idea of a university of one faculty was by no means a new one. Furthermore, the new type of university in London would not supersede the work of the London University, but would supplement it, which would be a great advantage on account of the enormous population.

Mr. Williams referred to the classical bias of the older universities. He pointed out the injury to industry of scholastic snobbery or caste in learning. A university would be proud of its research which discovered something new with regard to the atom, but research which instituted an improvement in soap would be beneath its dignity. The work of the College of Science was not diverted from its utility by such dignity. Nevertheless, that very point gave dignity and honour equal to that of any university, although in industry it does not seem to be recognised.

Science, both pure and applied, offers a basis broad enough for a university superstructure. The proposal to constitute a University of Science and Technology is a natural stage in the evolution of education. It was pointed out the fears entertained by some that the interests of pure science would be jeopardised or neglected are groundless, and largely based on fallacy. The interests of both pure and applied science would be well looked after. In fact, applied science very often leads back to pure science, and the work of the University of Science would cover the whole field.

It would not be an elevation of standing if the Imperial College were given rank as a university, for its present character and standing qualify it to receive that rank. But the influence of such a university upon technical and scientific education and on the modern industrial research movement would very soon become an obvious advantage in industry. The highest technical knowledge could be given to the student as it now is, and his quality and value would be recognised.

There are also the Imperial obligations of the Imperial College to be considered, and the needs of students and graduates from Overseas Dominions. These students would in countless numbers of cases prefer to study at the Imperial College of Science, but were diverted from doing so because the degree is obtained at the University.

Discussion

The President, before asking for debate, referred to the point about pure and industrial science. He said industrial science research was like seeing an object in view and going out to take full possession of it, to examine it, and get the full value out of it, but pure science research was like a voyage of discovery in Elizabethan times, when the explorer did not know where he would ultimately find himself, but he was the man who located what the others would go out to take full possession of and both parties were necessary.

Dr. Unwin was then asked to open the debate, and did so by entirely agreeing with Mr. Williamson's proposal that there should be given to the Imperial College the rank of a university. But, he said, the College is in front of a Hindenburg line, which they would have to attack. He hoped they would break through.

Professor Watts declared that the education of the College was more liberal than that of any other institution, and that its diploma is equal to a degree. But to emphasise the universal estimation placed upon the degree he mentioned a case which came to his notice as one of the managers of the board of a certain school. A student with a first class tripos applied for a post, and in every particular gave satisfaction, with the exception of not possessing a degree. Another student from a different university was given the appointment, although, perhaps, not so efficient, because a degree had been conferred.

Among others who took part in the debate were Messrs. Hunt, Simmons, and Garland, Dr. Starling and Professor H. E. Armstrong.

The Allied Chemical and Dye Corporation

THE Allied Chemical & Dye Corporation is the name chosen for the merger of General Chemical, the Barrett Co., Solvay Process, Semet-Solvay and National Aniline & Chemical. It is officially announced that the authorised capital stock will include $65,000,000 7 per cent. cumulative preferred of $100 par value and 3,000,000 shares of common stock without par value. It is estimated that the outstanding capital of the company, based on the deposit of all outstanding stock of the consolidating companies and eliminating inter-company holdings, will consist of the undisturbed bonded indebtedness of the consolidating companies, amounting to $9,493,000; $39,374,300 7 per cent. cumulative preferred stock and 2,119,677 shares of common stock.

The new principles of colour phenomena proclaimed by Professor William Ostwald are likely says *Drug and Chemical Markets*, to be the subject of investigation by German dye and textile interests in the hope that discoveries may be made which will again place Germany in a position to claim supremacy in the world's dye markets. A fund of 14,000 marks has been subscribed, a large part by the Badische Anilin and Soda Fabrik. Nothing is yet known of the "discovery," which Professor Ostwald holds secret. Those who are financially interested believe the results they hope for will revolutionise the dye industry.

Coal Veins of Peru

By Mr. W. Campbell

AT the annual meeting of the Institution of Mining Engineers held in the Heriot-Watt College, Edinburgh, on Saturday, October 9, a paper was read by Mr. William Campbell on "The Coal Veins of Peru." These coal-veins were not, in his opinion, of the same origin as common coals. They were of an asphaltic nature, occurred in veins, and might be classed as asphaltites. There were in the province of Yauli, in the Department of Junin, Peru, two distinct series of these veins. They lay on the eastern slope of the Andes, and occurred in the mountains at an altitude varying from 12,000 ft. to 16,000 ft. The veins had all a strike from east to west, and on the whole were fairly true to course. They were about 20 miles apart. The first might be called bituminous, and the second anthracitic.

The Bituminous Series

The bituminous coal made splendid house coal, but was also used with a mixture of 50 per cent. of anthracite from the other series for making blast furnace coke. The coal in the veins was amorphous, having neither cleats nor backs, and no fossils or woody structure had been observed, which was in itself, Mr. Campbell thought, a strong proof in favour of classifying these as entirely different in origin from ordinary coals. These coals burned easily with plenty of flame, and gave off much smoke and a great amount of oil or pitch; indeed, when burning in an open grate this substance would often be found dripping on to the hearth. In a close stove the pitch would accumulate in the bottom to such an extent as to cut off entirely the draught and prevent further combustion. In actual mining, owing to the soft nature of the coal, a great deal of dust was made, and where the mines were dry it was highly inflammable. So long as the tallow candle or oil lamp was used for lighting purposes no explosions occurred, but since the introduction of calcium carbide as an illuminant, explosions had been quite common.

The following theory might be advanced as affording a solution of the origin of this deposit: An oilfield was in existence, and, due to earth-movement setting up great heat, the oil was volatilised, and the ascending vapours in their passage through these open fissures in the limestone condensed and cooled, leaving solids which filled the veins. There were other evidences of this action in the region of Oroya, in the same province. Oil shales, or supposed oil shales, were known to exist, and had recently been announced as a mining concession. These shales, which on tests had yielded 15 gallons of oil per ton of shale, were not true shales, but impregnated limestones.

The Anthracitic Series

The second series of veins were at Yauli, about 25 miles to the south-east of the former series. They were more irregular than those at Huari. The country seemed to have undergone a later movement, and was much contorted and badly broken up. The veins had an angle of dip varying from the vertical to 45 deg. In this series coal was being mined at Rumichaca, and had also been mined at Llaesa-cocha, about 20 miles east, on the same system. At Rumichaca, 500 tons per month was mined, and after being mixed with 50 per cent. Huari coal, was used for making blast furnace coke. This coal was an anthracite, and was of little use for any other purpose than that mentioned.

Mr. Campbell submitted an analysis of the yield of samples of this coal: No. 1, 2·44 per cent. ash, 8·20 volatile matter, 86·40 fixed carbon, and 4·65 sulphur; No. 2, 12·9 per cent. ash, 10·70 volatile matter, 71·40 fixed carbon, and 5·82 sulphur. No. 3, 9·74 per cent. ash, 9·70 volatile matter, 74·60 fixed carbon and 6·55 sulphur.

At Llacsacocha, the coal seemed to have undergone further change, and while the ash of all the coal contained vanadium, this contained probably sufficient to make the working for vanadium a commercial success. Two samples of this coal gave the following analysis: No. 1, 12·8 per cent. ash, 10·5 volatile matter, 76·7 fixed carbon, 3·1 variation in ash; No. 2, 2·8 per cent. ash, 9·0 volatile matter, 88·2 fixed carbon, 15·0 variation in ash.

Mr. H. ELLIS, of Brandeis Goldschmidt & Co., has been elected chairman of the Council of the British Federation of Iron, Steel, Tinplate and Metal Merchants for the ensuing year.

Appeal by the University of Birmingham

THE Senate and Council of the University of Birmingham last week launched an appeal for half a million pounds. It is pointed out that on the applied science side the increase in students since the Armistice has been abnormal. The Faculty of Chemistry, together with other faculties, is being removed to the new University Buildings at Bournbrook, and in order to provide for the demands of physics and chemistry additional temporary laboratories are being provided. Ten army huts, 70 ft. by 30 ft., have been purchased and erected on convenient sites, and these are being equipped with work benches, fume cupboards, apparatus and material.

The new session of the University began on October 4 with a phenomenal entry of students in engineering, metallurgical, industrial chemistry, petroleum and coal mining, &c. Sir Gilbert Barling, the Vice-Chancellor, pointed out to a representative of THE CHEMICAL AGE that the amount of Government support would depend largely upon the amount that was subscribed. The University was so equipped as to be of special value to industry, and the hope was entertained that manufacturers would help. It was a singular fact that the greater the strength of the University in relation to students the more pronounced the actual loss, because the students' fees covered only a little more than a fourth of the actual loss; but the Council of the University thought it would be very unwise to increase the fees, as that might debar the very men whom they wanted from continuing their training.

The appeal for £500,000 was formally inaugurated at important meetings on Thursday, October 7, and £200,000 was promised. Lord Robert Cecil, M.P. (Chancellor), presided, and Mr. Austen Chamberlain, Chancellor of the Exchequer, paid tribute to the important part played by the universities during the war, particularly with regard to science. This year the Government contribution was a million; next year he hoped it would be a million and a half. Even in difficult times like the present, when expenditure must be made with care, the Government were prepared to back their opinion of the importance of university work.

Mr. Grant Robertson, the Principal, alluding to the importance of research work, said a university which was not carrying on research was a crippled educational organisation. Research paid. He did not mean merely that it would give a dividend in cash. It would do that, but it paid ultimately in a general and heightened national efficiency. He ventured to say that if we had put more money into the universities for the ten years that preceded the war hostilities would have been shortened by two years.

Salt Industry in the Turks and Caicos Isles

THE yearly average production of salt from Cockburn Harbour the principal harbour of the Turks and Caicos Islands, for the last 10 years was 22,000 tons. The capital invested in the industry is about $500,000. Various attempts have been made to induce the owners of the salt ponds to improve the primitive methods in use, but so far with very little success. Recently, as the result of a comprehensive report made by an expert regarding the prospects of the salt industry of the colony, a meeting of all the proprietors of the salt ponds was held to meet the Government Commmissioner at South Caicos. He explained to them that owing to the great purity of the salt of the islands there was a keen desire on the part of importers in Buenos Aires and Rio de Janeiro to trade with them. They could only do so, however, under more up-to-date local conditions than those prevailing. The expert referred to, he said, had suggested certain improvements at the East Harbour as well as at Cockburn Harbour, which, when carried out, would secure an annual output of salt of two to three million tons and cause a saving of 55 cents per ton in the expenditure entailed by the present antiquated and wasteful methods. He strongly advised them to come to some definite understanding now as to what should be done if their industry were to prosper in future. The expenditure required to bring about the improvements recommended amounted to $200,000, and the proprietors decided that a new company should be formed for the purpose, all present undertaking to deal with this new company regarding the storage, handling and shipment of their output.

Turkish Trade in Chemicals

WHAT is meant by the word Turkey requires a very up-to-date map to determine. A report on the trade and economic conditions of Turkey for the year 1919 has been issued by the Board of Trade, and a sketch showing the districts covered is included. The area taken into consideration is that portion of Asia Minor of which the administration was, at the time of writing the report, under the Army of the Black Sea and Turkey in Europe according to the pre-war limits.

Opium Supplies

Opium is growing very successfully in the north and west, and large quantities are produced in Vilayet of Aidin, the richest province of Anatolia. The stocks of opium in Turkey at the present day, according to the report, amount to 10,000 cases, of which 2,000 are at Constantinople, 3,000 at Smyrna, and 5,000 in Asia Minor.

Values of the above depend in a great measure on their origin, but can be based on the Afian Kara-Hissar quality which at present is quoted from 800 to 810 piastres (paper) per oke (2·82 lb.), with a tendency upwards.

It should be noted that the recent fluctuation in exchange has increased the price of opium by about 10 per cent.; the above valuation is based on present exchange.

There have recently been some important shipments for America, the major portion of which is destined, it is believed, for Japan.

During the war Germany and Austria drew between 3,000 and 4,000 cases.

With regard to Smyrna, opium of higher grades is principally collected near Afiun Kara Hissar, Ushak, Balikessir, Sparta, Konia, Sivas, &c. A lower grade is grown in the Aidin Vilayet near Alashher, Salihli, Akhissar, Nazli, &c. The crop is ususlly shipped from Smyrna or Constantinople to the United States of America, United Kingdom, and of late to Japan, which during the last six months has been the largest buyer. The present stock in Smyrna is about 650,000 lb. valued at from 14s. to 20s. per lb., deliverable at ports of destination.

About 47,000 okes of opium are exported yearly from Akshehir. Opium is also one of the main products of Balikessir, Kaza of Sindirghi, although the output referred to in the 1919 report is very small, 100 okes, as compared with 4,700 okes of a normal year.

Demand for Chemicals

From the Military Control and Relief Offices posted at the individual towns during the Armistice information has been collected concerning the economic conditions in certain interior towns. In the case of Adrianople tartaric acid and sulphur are among the principal goods required in the market. Chemicals, formic acid and sulphate are imported into Kutahia. About 50,000 kilograms of aniline and alizarine are used in Ushak yearly.

England maintains her place as the largest exporter to Turkey of drugs and chemicals.

The markets for chemical and pharmaceutical goods was held until 1912 by Germany and Austria, a certain amount of business being also done with Switzerland, Denmark, and still less with France. Imports from the United Kingdom occupied the last rank.

The reason for which more business in this line was not done with the United Kingdom was that British manufacturers never took the trouble to acquaint this market with their products. The question of packing (weights, measurements, and labels in English) was also a great impediment to trade, not to mention the terms of payment and delivery, which have already been dealt with, and apply to every article on which foreign competition has been successful in the past.

In 1912 a large firm in Constantinople established an agency for a British manufacturer and by 1914 had entirely ousted all competition and held the market.

Since the Armistice, with the exception of a few drugs from France, the United Kingdom has been the sole importer of pharmaceutical goods.*

* Doctors and chemists throughout Turkey being accustomed to the French Pharmacopœia, it is important that the names of all drugs and chemicals should be in French.

The best means for introducing British goods in this market is to open an agency with a permanent small stock, an exhibition of samples, regular visits by commercial travellers, free distribution of catalogues and pamphlets (in French, Greek, Spanish and Turkish), backed with a certain amonnt of advertising in the papers (especially in the case of proprietary medicines and druggists' sundries).

Goods on the Market

The principal pharmaceutical goods which were exclusively supplied by foreign countries are as follows :—*

Acetic acid (important consumption), Austria and Holland; tartaric acid (important consumption), Italy, Spain, France and Austria; carbolic acid Austria; carbonate of lime (important consumption), France and Belgium; vaseline, Belgium; iodine, salol, bismuth, pyramidon, antipyrin and phenacetin, Germany; quinine, Germany.

The market prices ruling in Constantinople at the end of 1919 were, per kilo :—

Sulphate of Soda	8 Pst.
Aspirin	450 ,,
Iodine	800 ,,
Carbolic acid	125 ,,
Antipyrin	900 ,,
Boric acid	55 ,,
Lactic acid	900 ,,
Citric acid	250 ,,
Sulphuric ether	225 ,,
Glycerine (28 degrees)	80 ,,
Vaseline	85 ,,
Calcined Magnesia	125 ,,
Permanganate of potash	200 ,,
Benzine	35 ,,
Carbonate of soda	20 ,,
Naphthaline	14 ,,
Indian Saffron	2,500 ,,
Liquid ammonia	60 ,,
Acetic acid	275 ,,
Bromide of potash	125 ,,
Arsenic (white powder)	300 ,,
Sulphuric acid (chemically pure)	200 ,,
Borax	35 ,,
Mercury	500 ,,
Italian sulphur (99 per cent. in sack)	20 ,,

Chemical Engineering

IN constructing a main line 36-in. sewer for the conveyance of acid waste, for a pulp mill in Quebec, the question arose as to what material should be used in pouring the joints. Cement was out of the question on account of the deteriorating effect acid would have upon it. A number of mills were corresponded with upon the subject, but no very satisfactory method was recommended.

Pulp and Paper Magazine says that ultimately the use of sulphur and sand was suggested by the Engineering Department. Lead wool was considered but rejected upon the ground that the cost was high. On the other hand, sand was available on the ground from excavations and sulphur could be purchased at the dockside in Three Rivers.

The method used was as follows :—

"An ordinary iron boiling cauldron over an open wood fire was used for heating the sulphur and sand. The proportions used were one to one. The whole was heated until the sulphur melted and a semi-liquid mass formed. Three pipes were placed vertically in the trench and by means of a galvanized conductor pipe bent at one end to fit into the flange of the pipe, the mixture was poured from a ladle on the top of the trench directly into the joint. The joints of each section of the three pipes in the trench were then poured in the ordinary manner with the use of a runner."

"The inside of the joints were pointed with wet clay. The joints cast and became solidified in about one hour after pouring. The length of time for solidification, of course, depended upon the coldness of the weather.

"The joints so far have been all that could be desired, having neither blow-holes nor cracks. The solidified sulphur and sand is extremely hard and the only impression made on it with a large knife was to scrape fine particles away. In appearance it is almost metallic."

Chemicals and Dyes in Argentina

THE Commercial Secretary to H.M. Legation at Buenos Aires in his report for 1919, which has been published by the Board of Trade, says representatives of German manufacturers are offering merchandise on the Argentine market at prices below those at present ruling for similar articles. These agents admit that the goods on offer are from stock, and that firm orders for new articles cannot be taken by them at present. Among the principal lines offered by German agents are heavy chemicals and aniline dyes. Sellers are quoting in marks for shipment f.o.b. Amsterdam without promise of fixed dates for delivery.

Competition

In the competition between the United States and the United Kingdom for Argentine trade, the prospects of the United Kingdom would normally depend upon the demand for her goods, prices, and credit facilities. To-day they depend upon ability to supply and prices. All conditions of demand are heavily in favour of the United Kingdom, the extension of credits has become a secondary consideration, and the problem is simplified to a question of delivery, prices, and freights. If British manufacturers can deliver in approximately the same time as their United States competitors, at prices which are equivalent to or not greatly in excess of those of the United States, they should regain their leading position in the Argentine market.

British trade has the advantage of a strong and firmly established connection with Argentina in the form, firstly, of resident British firms and traders with life-long experience of the requirements of the market, and, secondly, of the old established houses of other nationalities in Buenos Aires, whose appreciation of British exporters' methods and merchandise has been greatly increased by their experiences during the war. This advantage of established connections and mutual knowledge will have great weight if British industries can produce the merchandise required at competitive prices.

There is also on the side of the British the legitimate influence due to the heavy investment of British capital in Argentine enterprises of all descriptions. The United States increased their trade by following the German system of merchanting rather than the British system of investing, and for that reason their prospects may be regarded as being less favourable.

Depreciated sterling is a further factor which should result, at the present moment, in a preference of 30 per cent. in favour of British goods, sterling exchange being in favour of Argentina to that extent, with a tendency to further depreciation while dollar exchange, long at par, now shows a depreciation of 2 per cent. This preference cannot be counted on to work mathematically, for various reasons, but that it operates partially up to the limit stated is certain.

Factor of Price

The factor of price in British and American competition refers to price of merchandise delivered at Buenos Aires, and comparative rates of freights from the two countries have, therefore, an important influence. At the present time exports to Argentina from the United States are favoured by considerably lower rates of freight than those ruling from the United Kingdom. Importers of British goods attach the greatest importance to efforts being made by British shipping interests to equalise these rates, and they draw attention to the number of vessels which arrive from the United Kingdom in ballast or with part cargoes, as also to the fact that British ships are engaged in carrying freights from New York to Buenos Aires at these lower rates.

Imports of tartaric acid into Argentina Republic during the periods shown, were shipped by the following countries :—

	1913	1917	1918	1919 (first six months)
Germany	433,761	—	—	—
Italy	413,992	157,853	—	—
United Kingdom ...	125,442	89,912	—	—
France	116,743	51,382	—	—
United States	—	2,431	—	—
Other countries ...	57,415	—	—	—
Total	1,147,353	301,578	132,326	93,203

Reviews

TECHNICAL HANDBOOK OF OILS, FATS AND WAXES. By P. J. Fryer and F. E. Weston. The Cambridge Technical Press. Vol. I. Third edition. Pp. 280. 15s.

The third edition of this volume follows very closely the plan adopted in its predecessors. It is divided into six sections, the first three dealing with the general chemistry, methods of testing and analysis. The fourth section gives a very comprehensive descriptive classification of oils, fats and waxes divided for convenience into glycerides and non-glycerides, the latter again subdivided into saponifiable and unsaponifiable substances. One section is devoted to the production and refining of the oils, fats and waxes, and the last section to the oleo resins and essential oils.

The value of the book to the edible oil or paint technologist and to the public analyst has been greatly augmented by the inclusion of the latest data on the physical and chemical characteristics of the more common animal and vegetable oils.

It is a pity that the generic name of oil has been applied to such diverse substances as butter fat, petroleum and turpentine, thus necessitating the inclusion of the crude oil and essential oil industries in the one volume. Since only fifteen and eight pages respectively are devoted to these industries, which are quite as important as the edible and paint oil manufactures, the book is of but slight value to those particularly interested in these fields.

Very little space is likewise devoted to the refinement of oils and the hardening of fats, subjects on which both the scientific and industrial literature is rapidly increasing. A modern edible oil technologist might reasonably be expected to know the nature of the various grades of Fuller's earth, employed for bleaching, the alternative methods of removing free fatty acids from otherwise edible oils, and the mechanical processes employed for reducing the neutral oil content of the foots, and many other industrial problems which are common knowledge to those engaged in the industry. The volume is clearly and pleasantly printed, and the information contained therein is readily accessible through the index. It is a valuable book to the analytical chemist.

ERIC K. RIDEAL.

Metallurgy at Cambridge

THE Goldsmiths' Company last week formally opened a new building which they have erected for the study of metallurgy at Cambridge University. The Department of Metallurgy was founded and endowed by the Goldsmiths' Company in 1908. At first it was housed in small rooms in the Chemical Laboratory, and next in rooms vacated by the Department of Agriculture, but with the increasing number of students further accommodation was urgently required. The Goldsmiths' Company in 1918, on the offer from the University of a site adjoining the Laboratory, liberally gave further donations for a building and the equipment of the adequate and up-to-date new rooms opened on Tuesday. The opening ceremony was performed by the Prime Warden of the Goldsmiths' Company, Mr. Robert Montague Tabor, who was accompanied by the three Wardens, Messrs. C. T. A. Heycock, F.R.S. (who was appointed First Reader in Metallurgy at the University, and still holds that position), H. C. Pearson and L. W. C. Butler. Amongst the members of the University present were the Vice-Chancellor (Dr. Peter Giles, Master of Emmanuel), and the Master of Trinity College (Professor Sir J. J. Thomson), and Dr. G. D Liveing, who 60 years ago was elected a Professor of Chemistry.

DYES and dyestuffs valued at $884,952 were imported into the U.S.A., according to *Paint, Oil & Chem. Review*, during July. The importations included the following goods and values: Alizarin and Alizarin dyes, $56,745; colours and dyes not specified, $688,224; indigo synthetic, $113,898; extracts and decoctions for dyeing, $26,085. There were no shipments received of natural indigo during the month. Dyes from Germany included in above list are as follows: Alizarin and Alizarin dyes, $49,138; colours and dyes not specified, $263,747; indigo synthetic, $10,005.

The Belgian Chemical Industry

A SHORT time after the Armistice the Compagnie Belge pour les Industries Chimiques was formed by the Banque Industrielle Belge and the Goupain group to take over the great factories that the Germans had been exploiting in Belgium before the war, and which the Belgian Government sequestrated as soon as it got back to Brussels. Thus, a short time after its constitution the Compagnie Belge pour les Industries Chimiques bought the German rights in the great factories of Droogenbosch, situated at the gate of Brussels between the canal and the railway. These factories were started again as fast as they could be repaired, section by section, and by the end of this year they will all be working full time.

According to the results known for the past 14 months' running of the Droogenbosch company, and notwithstanding the delays that have attended the resumption of work affecting the various products, it is expected that there will be a dividend of at least 200 f. after writing off important sums for amortisation and reserve.

The Société Belge pour les Industries Chimiques bought the German rights four months ago in joint account with its subsidiary, the Droogenbosch Company, the most important Belgian factory for the production of superphosphates, on the quay of the Scheldt at Burght, near Antwerp. These factories, which suffered relatively little from the war, have been doing partial work for about a month. By the end of November next they will have been fully re-equipped, and will resume their old-time production. It is believed that the profits of the Burght concern will at least equal those of the Droogenbosch concern. The company has also bought from the sequestration the Hemixem tanning and colour works, previously run by Germans on the banks of the Scheldt, with a railway connection. These factories will be started to work, it is hoped, this month.

The Brussels Market is getting over the crisis that has been paralysing it for about six months. Colliery, metallurgical, glass, &c., shares, but particularly chemical shares, have led the way to levels of higher value The Hemixem, the Société Générale des Produits Chimiques and the Société des Produits Chimiques de la Basse-Sambre have run up 10 per cent. to 20 per cent. recently, but it is particularly the Compagnie Belge pour les Industries Chimiques and their subsidiary—the Compagnie Produits Chimiques de Droogenbosch—that appear to benefit, especially from the upward movement just announced.

Insoluble Chemical Manure

CONSIDERABLE interest is being revived among those sections of the chemical industry which directly or indirectly are associated with the world's supply of fertilisers, over the question of the comparative merits of soluble and insoluble manure. Before the war the Agricultural Department of the Belgian Government conducted extensive experiments with a view to determining the position in relation to one another of superphosphates, basic slag and Bernard's phosphates. The latter is claimed to be an insoluble manure which is finer and better than basic slag. With the exception of oats treated with super-phosphates, in which case a very slightly better result (3 per cent.) was produced, the trials proved that the three manures were almost invariably of equal value.

It has generally been advocated that the more soluble the fertiliser the better the result, and it is interesting to learn that the Belgian Agricultural Department have come to a contrary conclusion, or rather that their experiments have convinced them that solubility is not essential to efficiency.

Bernard's phosphate is a product of Belgium and is composed as follows :—

	Total per cent.	
Contents of phosphoric acid	18 to 20	20 to 25
Silica	2 to 3	3 to 4
Oxide of iron and Alumina	1 to 2	1 to 2
Magnesium	1.75 to 2	1.75 to 2
Lime and carbonate of lime	50 to 60	40 to 55
Potash and soda	1.50 to 3	1.50 to 3

Fineness—95 per cent.

Another insoluble manure is Ephos Egyptian phosphates, a rock substance powdered.

Electrostatic Methods of Gas Cleaning

AT the Cardiff meeting of the Iron and Steel Institute Messrs. A. Hutchinson & E. Bury, of the Skinningrove Iron and Steel Works, gave an account of the application of the Lodge discharge system for rough cleaning blast furnace gas. By this system, gas at the rate of 40,000 to 80,000 cubic feet per hour was treated with a reduction of dust from 4 to 5 grams per cubic metre down to ·2 to ·5.

A feature of blast furnace dust was its high content of potassium chloride, which frequently occurred in the soluble form to the extent of 20 per cent. and over, and from this source the separation of pure potassium chloride presented few difficulties. Its isolation was accomplished in two stages. A mixture of sodium and potassium chlorides was first separated from calcium chloride, and potassium chloride was then obtained from the mixture of alkali chlorides by taking advantage of the fact that potassium chloride increased in solubility with a rise in temperature, while sodium chloride acted in the reverse manner. The dust was collected in concrete tanks and continuously stirred with water to produce a thin slurry. This slurry was boiled in steel vessels, and ran continuously down a series of revolving vacuum filter drums. The filter cakes was detached and washed with weaker liquors, the final washing being effected with water. The strong liquors from this extraction process were evaporated until at 62 deg. Twaddel the alkali chlorides separated down to 94 deg. Twaddel. The mixed chlorides were dissolved in hot distilled water, and again evaporated until the density of the liquor was 49 deg. Twaddel, when potassium chloride separated out. Further crystallisation was effected in a revolving crystalliser.

Summarising the results, it was considered proved that with 80 to 85 per cent. of the electrostatic plant at work, dust had been satisfactorily reduced from 5 to 6 grams per cubic metre down to ·8 to 1·1 gram in the cleaned gas, this being effected with a total fuel consumption corresponding to only 50 kilowatts. No power was required for pumping water or moving gas. Comparatively small losses of sensible heat were involved amounting to 20 deg. to 30 deg. C. Appreciable fuel economy was effected by the uses of cleaned gas and the recovery of dust containing 27 per cent. potassium chloride amounted to from 48 to 50 tons per week.

Shoe and Leather Fair

ALTHOUGH chemicals and dyes are largely used in the leather industry very few manufacturers exhibited at the Leather Fair at the Agricultural Hall. The stage in leather making when chemicals are mostly used was not the theme of the fair. Among the exhibits the results of dying were apparent in wide ranges of articles, from ladies jumpers in chamois to military boots and heavy trunks. Leather like silk and leather like bone bore testimony to the numerous colours used in dying leather. Skins in black were shown dyed by means of natural material and light colours by aniline, but the actual dyes were scarcely to be found.

The Yorkshire Dyeware Co. Ltd., were among the few people presenting dyes for inspection. They have instituted a factory in Jamaica, where hematine paste and crystals and other items are made on a large scale for importation into this country. As aniline black is not as popular as the logwood or natural extract the means of augmenting the supply of logwood extract from Jamaica is a decided advantage.

Ajax Aniline Dye Manufacturing Co., Ltd., of London Wall, also occupied a stand and exhibited examples of their wares.

Tasmanian Paint Industry

THE newly-established paint industry in Tasmania is reported to be making satisfactory progress. Manufacture during the past year was curtailed owing to the difficulty of obtaining supplies of linseed oil. The value of mixed paint and paste sold last year was £4,278. The Mines Department reports that the demand for Tasmanian paint is growing, as its high quality is becoming better known. It is made from Tasmanian pigments.

At the last meeting of the South Wales Section of the Society of Chemical Industry, at University College, Cardiff, Professor C. M. Thompson lectured on the "Industrial Application of the Rare Gases."

The Nitrate Market

Continued Inactivity

MESSRS. Henry Bath & Son, Ltd., in their monthly report on nitrate of soda, dated October 7, state:—

Throughout the past month the nitrate market has remained inactive, and very few transactions have been reported either in cargoes or in nitrate f.a.s. Chile. A cargo expected to leave Chile this month by sailing vessel was sold a couple of weeks ago at the parity of 23s. 3d. per cwt. c.i.f. Bordeaux/Hamburg range, and this figure to 23s. per cwt. c.i.f. continues to represent sellers' ideas for season shipment. The official prices of the Nitrate Producers' Association for shipment f.a.s. Chile remain at 16s. 10d. per quintal for October shipment, 17s. 1d. for November, 17s. 3d. for December/March, and 17s. for April, but while re-sellers and outside producers are offering at a discount of 1s. to 1s. 6d. per quintal on the Association's prices, the latter are necessarily somewhat nominal. The quantities so offered are probably not large, but acquire an exaggerated importance on the present dull market.

With a view to preventing outside producers in Chile from underselling the Association, the policy of differentiating the export duty against them appears once again to have been mooted, but it seems to be a very controversial and possibly impracticable question. Mail advices from Chile continue to draw attention to the scarcity of labour in the Tarapaca district, where there is considerable competition among producers at increasing rates of pay for the restricted supply available. The higher wages which have to be paid to secure and retain labourers are being reflected in the cost of production, but so far the output does not appear to have suffered to any material extent.

Demand on the Continent generally is so far only moderate, and for the most part consumers are waiting in the hope that an improvement in the value of local currency will later on permit of purchases on more favourable conditions than those prevailing at present. The general financial situation, moreover, is opposed to extended commitments. On the other hand, the existing level of exchange appears to be regarded in Belgium with more equanimity, and consumers have been purchasing fairly freely for next spring's delivery, although at comparatively low prices. Inquiries from Central Europe for important quantities have been deferred by the recent deterioration in exchange. In order to give consumers the opportunity of any improvement in their currency, offers have been made in some continental centres to sell on a sterling basis, and a certain amount of business has resulted, but, generally speaking, such proposals have not met with much favour.

Freights have a firmer tendency with fixtures for November loading reported at 100s. to 105s. per ton basis Bordeaux/Hamburg, and charterers outstanding at the latter rate.

Disinfectants for South Africa

H.M. SENIOR TRADE COMMISSIONER in South Africa has forwarded to the Department of Overseas Trade copies of tender forms for disinfectant fluid and powder for use on the South African railways. No definite quantities are specified, but the estimated annual requirements of the Railway Administration are 20,250 gallons of disinfectant fluid and 45,450 lbs. of disinfectant powder. Tenders must be received by the Secretary to the Tender Board, South African Railway Headquarter Offices, Johannesburg, not later than noon on October 25, 1920, in the case of the fluid, and November 8, 1920, in the case of the powder. In view, however, of the limited time available for submitting tenders for the disinfectant fluid, this information may possibly be of use only to United Kingdom firms who have agents in South Africa who can be instructed by cable. The tender forms, with full particulars as to conditions, &c., may be seen on application at the enquiry room of the Department, 35, Old Queen Street, Westminster, S.W. 1.

"Death from heart failure due to the inhalation of irritating fumes" was returned at an inquest at Huddersfield on Monday, regarding the death of Herbert King, labourer, Hartshead, who was found unconscious in an acid shed at the chemical works of L. B. HOLLIDAY & CO., of Deighton, and died shortly afterwards.

Indigo in Assam

MR. W. A. DAVIS, the Indigo Research Chemist of the Government of India, reports that the yields of indigo to be expected in Assam are even greater than the 30 to 40 seers of cake indigo per acre obtained in Bihar when the Java plant was first introduced, and which have again recently been obtained on a few estates under proper manurial treatment. At several places in Assam where indigo has been grown during the past few years it has given quite extraordinary yields of plant—sometimes 300 to 400 maunds of green plant per acre in a single cutting. It gives, too, surprising yield of seed—10 to 15 maunds per acre. It not only gives very big yields, but contains a high percentage of indigotin in the leaf. Some plants anaylsed last year rather late in the season, and just before seeding, when the quality had slightly deteriorated, contained 60 per cent. of leaf and 0·7 and 0.87 per cent. of indigotin in the leaf (two different fields). Mr. Davis considers that with plants specially grown for *mahai*, and cut at the proper time, it would be reasonable to expect 60 per cent. of leaf and 1 per cent. of indigotin in the leaf. With this basis of calculation the probable yields per acre of cake indigo work out, with yields of 200 maunds of plant per acre, at 56 standard seers; and with 300 maunds of plant per acre at no less than 84 standard seers, or more than 10 times the highest average yield obtained in Bihar in the best of the last four years. In this estimate Mr. Davis allows for a probable 30 per cent. loss of indigo in manufacture by the ordinary Bihar process.

A good deal of experimental work has been done *The Times* states, by Mr. and Mrs. L. G. Tunstall, and for some years a seed indigo business has been carried on by Mrs. Tunstall and Mr. C. W. B. Taylor under the name of the Jorhat Indigo Syndicate. A company under the name of Assam Indigo, Ltd., is being formed with a capital of Rs. 15 lakhs. In addition to the indigo business, it is proposed to manufacture indigo due in the form of paste, for which an unlimited demand exists in China and the Far East. On behalf of the managing agents the Government of India arranged for Mr. Davis to visit China and Japan, where trials were made with a form of paste indigo developed at the Agricultural Research Institute at Pusa. The trials were entirely satisfactory, and when they were made last November the selling value of the paste in China was equivalent to Rs. 640 per maund of 60 per cent. indigo, as against a Calcutta selling price of Rs. 360 for ordinary cake indigo. The figures quoted give good ground for the expectation that Assam indigo can become a formidable competitor with the synthetic product in the world markets. Contrary to expectation, the demand for natural indigo has increased since the war, and prices have been ruling 50 per cent. higher than last year. Owing to the enormous increase in cost of production the price of synthetic indigo has very largely risen. It is a modest claim of the new concern that with the yield of indigo to be obtained in Assam by modern methods of cultivation and manufacture there would still be a good margin of profit even if the indigo were sold at the lowest pre-war rates of synthetic indigo.

Visit to United Alkali Co.'s Allhusen Works

ARRANGEMENTS have been made through the kind invitation of Mr. A. Rudge and the directors of the United Alkali Co., Ltd., for the members of the Newcastle Section of the Society of Chemical Industry to visit the Allhusen Works of the company at Gateshead on Saturday afternoon, October 23. The party will be shown the Leblanc Process for the manufacture of caustic soda, also the sulphur recovery department. Mr. Rudge will give a description of the plant and process at the Chemical Industry Club on Tuesday the 19th inst.

Recent Wills

Mr. T. P. Morson, Elsworthy Road Hampstead, of Thomas Morson & Son, manufacturing chemists	£26,828
Mr. J. Perry, F.R.S., of Stanley Crescent, Bayswater, W., professor of the Royal College of Science and Treasurer of the British Association	£10,343
Mr. W. Ransford, Bristol, chemist	£6,543

From Week to Week

Owing to the wage demands of the employees, the BADEN ANILINE SODA WORKS have been closed.

Mr. HENRY BELL, chairman of Henry Bell & Sons, artificial manure manufacturers, &c., died on Tuesday at Hexham in his 64th year.

A COMPANY with English capital has been formed in Ecuador to manufacture paper from recently discovered vegetable substances.

The transfer office of the UNITED BRITISH OILFIELDS OF TRINIDAD, LTD., has been removed to St. Helen's Court, Leadenhall Street, E.C.

CUMBERLAND COAL, POWER & CHEMICALS, LTD., have removed their offices to Nitrogen House, 31 and 32, Grosvenor Place, Westminster, S.W.1.

A Bill has been introduced into the Chilean Congress doubling the EXPORT DUTY ON BORIC ACID AND BORATES. The present export duty is at the rate of 10 pesos, gold, per metric ton.

MR. C. N. HINSHEL WOOD, of Balliol College, Oxford, has been elected to a War Memorial Research Studentship, and to a fellowship, tenable for three years, as lecturer in chemistry.

MR. H. A. SCARBOROUGH, B.A., of Clare College, Cambridge, has been awarded a Denman Baynes Research Studentship, of the value of £100 a year for two years, for research in chemistry.

Continuing his series of lectures before the Sheffield Branch of the NATIONAL ASSOCIATION OF INDUSTRIAL CHEMISTS, in the old Firth College, Dr. F. Rogers on Monday dealt with iron carbon.

Apparatus for the MANUFACTURE OF INDUSTRIAL ALCOHOL has recently been imported into New Zealand, and it is expected that in the near future thousands of gallons will be turned out annually.

Professor Bosch, an authority on NITRATE PRODUCTION, states that the Oppau and Merseburg works will after completion produce annually 300,000 tons of nitrate in the form of ammonia.

A fire which broke out last week in a three-floored building in West Ferry Road, Millwall, E., used as a chemical manufactory and store by E. REMY & CO., caused extensive damage to the building and its contents. The origin of the outbreak is unknown.

The Indian Government has decided to establish a SCHOOL OF MINING AND GEOLOGY, one of the principal objects of which will be to supply trained officials for the coal-mining industry. The establishment of a separate metallurgical research institute is also under consideration.

ACCORDING to advices from Bucharest the complete returns for the month of August from the various oil producing companies show an increase of 17,210 tons over the output for July, the chief increases being in the districts of Prahova, Dambovitza and Buzau.

The OUTPUT OF CHROME IRON and asbestos from Southern Rhodesia for the past six months has approximately doubled. Coal also shows some increase. The mica industry appears to be firmly established, and development at the mines continues satisfactory.

PETROL PRICES, which were raised by 7d. per gallon on August 30, were reduced by 3d. per gallon on Monday. The reduction is said to be due to a decline on the American oil export market, and it is believed that a slight fall in American freight charges is a contributory cause.

MR. R. MARSH, 39, Great Windmill Street, W.1, announces that he has opened a plumbing works at Watford, which he is equipping for the manufacture of saturators, acid tanks, and all classes of chemical lead work. He is also making arrangements for an outdoor staff of skilled chemical plumbers to be always at hand for lead work repairs.

Another industrial trust is being organised in Essen. A company with a capital of 75,000,000 is being formed to take over the Lothringen coal mine and several other coal and mining enterprises, the whole to be in the hands of the great Funke concern. The Lothringen Mining Co. is also interested in extensive chemical industries which produced large quantities of saltpetre during the war period.

Mr. C. PRICE-GREEN, commissioner of the Canadian National Railways, spent a week at the Chemical Exposition in the study of exhibits likely to be of use in the development of Canadian resources.

A Melbourne branch office of BRUNNER, MOND & CO. has been opened at Batman House, William Street, with Mr. S. F. Pollard as manager. The manager for Australasia is Mr. F. A. Cruttenden, whose office is in Sydney.

The Japanese Advertiser of August 31 gives particulars of a NEW PROCESS OF SALT MANUFACTURE which has been discovered by Dr. Ikeda of the Japanese Physical and Chemical Research Station. The process is to boil sea water, as it is. It is claimed that this process requires less labour and capital than the existing systems, and that it will result in a larger and cheaper supply of salt.

MR. G. WATSON, M.Inst.C.E., M.I.Mech.E., has ceased to represent the New Destructor Co., Ltd., and is carrying on his practice as a civil and mechanical engineer, at Walter House, Bedford Street, Strand, London, W.C. 2. His experience in connection with refuse disposal, and furnaces and boilers for steam raising from low grade fuel will still be available either to contractors for or users of such plant.

SIR HALFORD MACKINDER, M.P., chairman of Electro-Bleach & By-Products, Ltd., and Mr. W. Peter Rylands, a director of the Partington Steel & Iron Co. and the Pearson & Knowles Coal & Iron Co., are members of the Departmental Committee on Railway Agreements, appointed by the Minister of Transport to consider and report as to the nature and terms of the agreements made between the Government and the railway companies.

NEGOTIATIONS between the employers and workers in the bleaching, dyeing and calico printing trades in Lancashire, Cheshire, Yorkshire, and Derbyshire broke down at Manchester on Monday. The claim by the workers is for 40 per cent. advance on current rates, and a minimum of 25 per cent. over day rates for pieceworkers. The workers affected number 80,000. The present agreement expires on October 21, and there is a possibility of a complete cessation of work.

The death has taken place, at his residence, Ross-on-Wye, of Dr. E. W. PREVOST, F.R.S.E., who was born at Carlisle in 1851. After a distinguished University career at Edinburgh, Leipsig and Heidelburg, Dr. Prevost worked for some time at the South Kensington School of Science and the London Institute, Finsbury Circus, where he did chemical research under Dr. Norman Lockyer. Later he taught chemistry at Oxford University, and was Professor of Agricultural Chemistry at Cirencester.

The death occurred recently, in his seventy-second year, of Dr. H. N. Morse, professor of inorganic and analytical chemistry and director of the chemical laboratory at John Hopkins University. Mr. Morse graduated at Amherst in 1873, and after a period of study at Göttingen returned in 1875 to his old college as an assistant in chemistry. In the year following he was appointed associate professor at John Hopkins, and in 1891 was promoted to a full professorship. He carried out many original researches on osmotic pressure and related subjects.

ON THE OCCASION of the opening of the term, an inaugural lecture was delivered on Thursday, October 7, by Professor A. R. Ling in the Department of Brewing and Bio-chemistry at Birmingham University. The last session, Professor Ling said, had been a record so far as numbers of students were concerned, and their standard proved exceptionally high. In the session now opened the number of students was even greater. The department was well equipped for training students in the fermentation industries, bio-chemistry, sugar technology, foods and drugs, and applied bacteriology.

Before the Departmental Committee appointed to inquire into the state of the law with regard to the POLLUTION OF THE AIR BY SMOKE and other noxious vapours, Mr. F. E. A. Box, managing director of Mackie & Co., distillers, described recently the effect of the noxious vapours at Port Dundas on the health of their workers and on materials. They had had several complaints from employees as to the contamination of the air by the neighbouring chemical works. Its effect on material was such that they could not maintain galvanised iron roofing, and the iron hoops of casks were eaten away by the presence of these gases.

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SULPHIDES. Triethylene tri- and tetra-sulphides. Sir Prafulla C. Ray. *J. Chem. Soc.*, September, 1920, pp. 1090-2.

CODEINE. Estimation of codeine; tests of methods, accurate estimation of small amounts of narcotine or codeine in poppy capsules. H. E. Annett and Haridas Sen. *Analyst*, September, 1920, pp. 321-8.

MARGARINE. Laws relating to the manufacture of margarine in U.S.A.; applicability to the margarine laws of the Australian Commonwealth. *Ind. & Aust. Mining Std.*, September 2, 1920, p. 437.

United States

EXPOSITION OF CHEMICAL INDUSTRIES. Sixth Annual Exposition of Chemical Industries, New York. Chemistry's importance in nation's defence and in emergencies of daily life. Dr. C. H. Hertz. *Drug & Chem. Market.* September 22, 1920, pp. 597-9.

PHOSPHATE. Rock deposits in Morocco; French allocation of African rock for 1919 and 1920. J. C. Martin. *Chem. and Met. Eng.*, September 27, 1920, p. 606.

LEATHER. Report on the leather section of the American Chemical Society; nitrogeneous fertiliser from tannery waste sulphide liquors; the effect of concentration of chrome liquor upon the absorption of its constituents by hide substances; determination of hydrochloric acid and neutral chlorides in leather. *Chem. and Met. Eng.*, Sept. 27, 1920.

CALCIUM OXIDE. Extraction of calcium oxide from calcined magnesite. *Chem. and Met. Eng.*, September 29, 1920, p. 628.

MATITA ASPHALTUM. Products from dry distillation; fractional distillation of the tar; composition of matita asphaltum. C. Nicolescu-Otin. *Chem. and Met. Eng.*, September 29, 1920, p. 631-2.

SILK. Artificial silk industry in America. *Chem. and Met. Eng.*, September 29, 1920, p. 640.

Nitrogenous Fertiliser from Tannery Waste

AT the sixtieth meeting of the American Chemical Society, Leather Section, Mr. D. H. Kadish, in a paper on "A New Method for the Recovery of Nitrogenous Fertiliser Material from Tannery Waste Sulphide Liquors," stated that there are two methods of liming—the still and paddle process and the sodium sulphide process. The method designed for the recovery of these liquors consists of a tank from which it is drawn into an orifice box, and subsequently at a pipe connection meets with acids drawn from a similar tank, usually sulphuric or liquor made from nitre cake. After the two have joined in the pipe the flow is carried on to a settling tank which contains a slight excess of acid. This settling tank is covered over, and has an exhaust port at the top for recovering the H_2S and carrying it to a tower where it may be made into sodium sulphide and re-used. The recovery of sodium sulphide is from 50 to 75 per cent. of that employed in the tanning. At the bottom of the settling tank the liquor is finally drawn off, leaving a solid material in the tank which consists of colloids packed down of their own weight. This colloid matter, being changed to triscoids, is shovelled out. It has a maximum water content of 10 per cent., and may be sold on the market for fertiliser. The plant may be erected to have a capacity of from 3,000 to 30,000 gallons of waste liquor per hour. The operation of the plant shows that 39 lb. of fertiliser may be recovered per 100 lb. of liquor. This fertiliser has an average content of 12 per cent. ammonia, and sells at the rate of about $72 per ton. The operation cost is slight. Analysis of the fertiliser showed 11·04 per cent. nitrogen, or 13·18 per cent. ammonia.

SINCE PROHIBITION came in force in the United States a large increase of deaths is reported from veronal, paraldehyde, chloral, aspirin, and other such drugs.

Patent Literature

Abstracts of Complete Specifications

150,762. FURNACES OR KILNS. R. J. Anderson, 1212, Mills Building, El Paso, Tex., U.S.A. Application date, April 4, 1919.

A furnace suitable for smelting iron or lead ore, is provided with combustion chambers surrounding the charge holder, and supplied with a large number of finely divided streams of fuel and air which intersect one another at a number of points. The burnt gases containing carbon dioxide pass into the charge and heat it to the required temperature. Secondary combustion chambers are provided above the primary chambers in which fuel is burnt to carbon monoxide and the gases also pass into the charge, and effect reduction of the ore.

150,785. EVAPORATION OF LIQUIDS OR RECOVERY OF VAPOURS OR GASES DEVELOPED THEREFROM. F. Merz, 20, Via Jacopo Duranti, Vercelli, Italy. Application date, June 4, 1919.

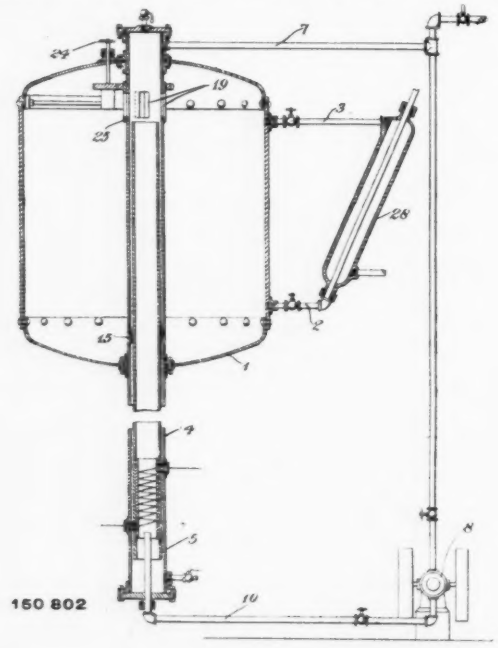
Liquid contained in the bottom of a casing is evaporated by means of hot gas which passes over the wetted surface of a rotating element partly immersed in the liquid. The gas passes upwards around vertical tubes in the casing to a cooler at the top where the vapour is condensed and is drawn off. The gas then passes downwards through the vertical tubes where heat is interchanged with the gas passing upwards. The gas then passes through the heater and is passed again into the liquid chamber where it effects a further evaporation. The apparatus is suitable for the concentration of sugar, acids, &c., or the distillation of alcohol, or crude ammonia.

150,786. EXTRACTING WATER FROM ANY MATERIAL CONTAINING IT. F. Merz, 20, Via Jacopo Duranti, Vercelli, Italy. Application date, June 4, 1919.

A volume of air or gas is circulated between two receptacles, one containing the material to be treated, and the other a hygroscopic substance, such as calcium chloride, or sulphuric acid, so that the air alternately absorbs moisture from the material and gives it up to the hygroscopic substance. The latter is regenerated by contact with dry air which may be heated by natural or waste heat.

150,802. HYDROGENATING OILS, PROCESS AND APPARATUS FOR. J. S. Withers. London. (From National Electro-Products, Ltd., 87, Church Street, Toronto, Ont., Canada). Application date, June 5, 1919.

A tank 1 is supplied with a mixture of oil and catalyst through the pipe 2, and hydrogen is pumped in through the pipe 10. Two concentric tubes 4 and 5 pass vertically through the apparatus, the tube 5 being open-ended to provide for circulation of the oil. The injection of hydrogen causes the oil to pass upwards through the tube 5 over the electrical heater 12, and down through the annular space between the tubes 4 and 5. Inlets 15 are provided in the tube 4, so that fresh oil may enter the circulation system when the openings 19 are uncovered by turning the ring 25, which is operated by the spindle 24. Hydrogen is returned to the pump 8, through the pipe 7. The circulation may be continued until the tank is filled with hydrogenated oil, or alternatively, hydrogenated oil may be continuously withdrawn through the pipe 3 and heat exchanger 28, so that it heats the incoming oil.

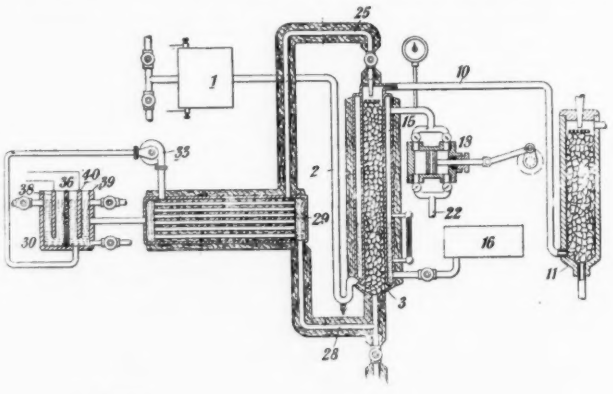


150,807. DRYING PROCESSES. T. Boberg and Techno-Chemical Laboratories, Ltd., "Fairlawn," Clarence Road, Clapham Park, London, S.W.4. Application date, June 6, 1919.

The apparatus is for drying solid matter, such as wet peat, and is a modification of that described in Patents 149,055 and 150,068. (*See* THE CHEMICAL AGE, Vol. III., pages 292 and 380.) The material is dried in two stages, in the first of which it is distributed on a heating surface, which is heated by the vapour given off after it has been slightly compressed to raise its temperature. The material is then carried by a screw conveyor through a long conduit, through which hot gases such as the combustion products from a boiler furnace, are passed in the reverse direction.

150,836. NITRIC ACID, PROCESSES FOR MAKING. The British Thomson-Houston Co., Ltd., 83, Cannon Street, London, E.C.4. (From the General Electric Co., Schenectady, N.Y., U.S.A.). Application date, June 17, 1919.

The apparatus is for making nitric acid by the oxidation of oxides of nitrogen in solution, which oxides may be obtained by the oxidation of synthetic ammonia. The oxides of nitrogen are produced in a chamber 1, and passed by a pipe 2, to an absorbing column 3, containing an acid resisting filling through which a stream of nitric acid of 60 to 70 per cent. strength, passes downwards. The residual gas passes out through a pipe 10 to another absorbing column 11, which is supplied with water. The column 3 is kept at a low temperature, *e.g.*, −40°C. by the evaporation of liquid ammonia in the jacket 15, the ammonia being drawn from the reservoir 16. Gaseous ammonia is drawn off by the pump 18, and delivered through the pipe 22, to the catalysing chamber 1. The solution of oxides of nitrogen in nitric acid passes by an



insulated pipe 28, to a heat interchanger 29, and thence to an electrolysing cell 30. The cell contains a cathode 38, in dilute sulphuric acid which is separated by the porous partition 36, from the anode compartment 39, containing an anode 40 of platinum, gold, or the like, immersed in the nitric acid solution. The nitrogen oxides are oxidised to nitric acid, and hydrogen is given off at the cathode and may be utilised for the production of synthetic ammonia. The nitric acid, which is now at a higher temperature, is passed by the pump 33, to the heat interchanger 29, where it warms the incoming cold nitric acid

and thence by the pipe 25, to the absorbing column 3. In a modification an alternative absorption apparatus is described, and also the complete plant for producing ammonia by synthesis, oxidising the ammonia to nitrogen oxides, and these in turn to nitric acid.

150,917. MERCURIC OXIDE, MANUFACTURE OF—BY THE DECOMPOSITION OF MERCUROUS NITRATE. G. Brusa and Dott. V. Borelli & Co., 4, Via Buscalioni, Turin, Italy. Application date, October 30, 1919.

Mercurous nitrate is placed with cast-iron grinding balls in a drum, which is connected by a tube to a similar drum containing mercury and cast-iron balls. The first drum is heated to decompose the nitrate into mercuric oxide and nitrogen oxides and the latter pass into the second drum which is cooled and supplied with oxygen which converts the mercury into mercurous nitrate. The mercuric oxide is obtained as a very fine powder.

150,940. STILLS. A. C. Jewell, 565, West Van Buren Street, Chicago, Ill., U.S.A. Application date, February 3, 1920.

A vertical cylindrical still is not closed at the bottom but dips into a pan which fits closely over the lower portion of the side walls, and extends upwards above the normal liquid level. Leakage is avoided by a packing ring. The still may be heated by gas, steam coils, or electric heaters, by disconnecting the pan and replacing it by another containing the appropriate heater.

International Specifications Not yet Accepted

147,415. SACCHARIFYING CELLULOSE. Zellstofffabrik Waldhof and V. Hottenroth, Waldhof, Mannheim, Germany. International Convention date, April 18, 1917.

Wood or the like is mixed to a paste with sulphuric acid of 75 per cent. strength, allowed to stand, and then boiled with water for saccharification. Lime may be added before or after filtering to remove the acid. If the paste is treated with cold water, the acid separated by adding lime, and the solution evaporated, a product resembling dextrin is obtained.

147,470. MOLYBDENUM, VANADIUM, ARSENIC, AND OTHER VOLATILE OXIDES. F. D. S. Robertson, Toronto, Canada. International Convention date, December 16, 1918.

Molybdenite is fed through a hopper to a rotary furnace and hot air is supplied by a perforated pipe within the furnace. The material is agitated by ribs on the furnace wall and the oxide is carried off by the hot gas to a chamber where it is partly cooled, and thence by a pipe to a tower and bag house. The gas from the bag house is forced into a pipe which passes through the tower and is connected to a pipe passing through the cooling chamber, from which it passes to the perforated pipe in the furnace. Air may be added to the gas stream, and the process is continuous.

147,474; 147,476; 147,488. HYDROGENATING NAPHTHALENE. G. Schroeter, 56, Luisenstrasse, Berlin. International Convention dates, February 24 and December 7, 1915, and May 13, 1916.

147,474. Naphthalene is purified by fusing with fuller's earth, and then treated at 120°-150°C. with the theoretical quantity of hydrogen at 3-100 atmospheres pressure in the presence of finely divided nickel as a catalyst. Decahydronaphthalene and other products suitable as lamp, motor, or lubricating oils are obtained.

147,476. This is a patent of addition to 147,474. The naphthalene is subjected to preliminary purification by fusing at 100°C. with finely divided nickel or iron, or with fusible metals, such as sodium or potassium in an atmosphere of hydrogen, and distilling off the naphthalene at reduced pressure.

147,488. This is a patent of addition to 147,474. The naphthalene is subjected to preliminary purification by fusing with sodamide, potassamide, or aluminium or calcium carbide.

147,495. HYDROCHLORIC ACID. J. Kersten, Neu-Octheim, Mannheim, Germany. International Convention date, May 10, 1916.

A mixture of potassium chloride and potassium metasilicate is fused, and steam is passed through for 1 hour producing the orthosilicate and hydrochloric acid. Similar salts of boric or phosphoric acids may be substituted for the metasilicate.

147,519. HYDROGEN. G. F. Jaubert, 155, Boulevard Malesherbes, Paris. International Convention date, March 9, 1918.

In the silicol process of making hydrogen, the powdered ferrosilicon is first treated with water to decompose phosphides and thus avoid risk of explosion in the generator. The paste of ferrosilicon and water is then treated with alkali lye in the generator.

147,530. ZINC OXIDE; BASIC LEAD SULPHATE. New Jersey Zinc Co., 160, Front Street, New York. (Assignees of F. G. Breyer, A. E. Hall, and G. R. Waltz, Palmerton, Pa., U.S.A.) International Convention date, July 12, 1919.

When producing zinc oxide or basic lead sulphate by the Wetherill process with briquetted ore, about 75-85 per cent. of the fuel is employed as a fuel bed about 5 in. to 6 in. thick, the remainder being briquetted with the ore and employed as a layer 4 in. to 5 in. thick. The addition of a reducing agent to the ore may be avoided by controlling the admission of air. After cooling, the briquettes may be readily separated from the fuel clinker or ash.

147,534. TANNING AGENTS, SYNTHETIC. M. Melamid, 56, Lorettostrasse Freiburg, Breslau, Germany. International Convention date, July 15, 1919. Addition to 137,323. (*See* THE CHEMICAL AGE, Vol. II., page 287.)

A tanning agent is produced by sulphonating heavy anthracene oil with strong sulphuric acid, diluting with water, neutralising with caustic soda, or with lime and caustic soda, and concentrating.

147,535. BLEACHING AND DISINFECTING AGENTS. G. Kereszty and E. Wolf, 4, To-utca, Ujpest, Buda Pest. International Convention date, July 12, 1919.

A solid mixture of alkali bicarbonates and basic magnesium hypochlorite is stable, but when added to water, a hypochlorite solution is gradually formed, the available chlorine tending to remain constant.

147,541. ELECTROLYSIS. E. Brunner, 69, Mullheimerstrasse, Basle, Switzerland. International Convention date, July 12, 1919.

To produce hydrazobenzene, *o*-hydrazotoluene, *o*-hydrazoanisol, &c., nitro, azoxy, or azo compounds are electrolysed. In an example, azobenzene is supended in caustic soda solution and a small proportion of lead oxide added. A current density of 10 amperes per square decimetre of cathode is used, the temperature being 60°-100°C. The cathode may be nickel, iron, or lead. The solid deposit on the cathode, consisting of hydrazo and azo-benzene and spongy metal, is removed during electrolysis and left in the electrolyte to complete the reduction.

147,543. ETHYL-HALOGEN-SULPHONATES; ALCOHOL. W. Traube, 11, Lutzowplatz, Berlin. International Convention date, July 14, 1919.

Gases from coke ovens or from lignite are treated with chlorsulphonic acid or fluorsulphonic acid. Ethyl-halogen-sulphonates are produced and may be hydrolysed to alcohol by water.

147,578. CATALYSTS FOR HYDROGENATION. E. Sittig, 26, Reinhartgasse, Vienna, and A. Granichstadten, 20, Alserstrasse, Vienna. International Convention date, July 7, 1917.

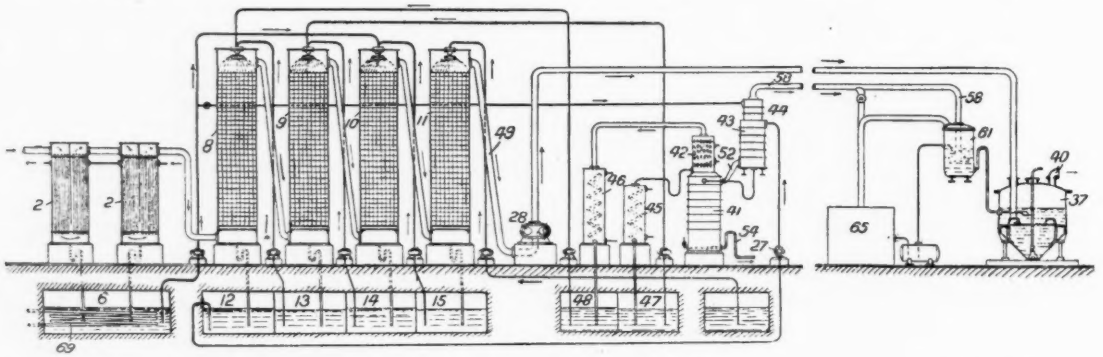
A mixture of nickel chloride with aluminium or magnesium chloride solutions is treated with alkali silicate, and the colloidal precipitate is washed, dried, finely powdered, and heated in a current of hydrogen to 300°-500°C. The subsequent hydrogenation is effected mainly at 150°-160°C. When crude oils are treated, the product is white, tasteless and odourless.

147,580. HYDROGENATING NAPHTHALENE. G. Schroeter, 56, Luisenstrasse, Berlin, and Tetralin Ges., 5, Behrenstrasse, Berlin. International Convention date, Aug. 1, 1916.

The process is similar to that described in 147,474, 147,476, and 147,478 above. The naphthalene is subjected to preliminary purification in the manner previously described, except that it is treated in the vapour state instead of the liquid state. The hydrogenation also may be effected with vaporised naphthalene. Tetrahydronaphthalene may be obtained.

147,583. PURIFYING COAL GAS. Firm of C. Still, Recklinghausen, Westphalia, Germany. International Convention date, December 10, 1917.

Crude coal gas is freed from tar and ammonia in condensers 2, the liquor collecting in a tank 6. The gas then passes through scrubbers 8, 9, 10, 11, where it is sprayed with concentrated solution from the ammonia recovery plant. The gas then passes to a saturator 37, where any remaining ammonia is absorbed as sulphate. The ammoniacal liquor is treated in a still 41, having a reflux condenser 42, and a second column 43 for separating carbon dioxide and hydrogen sulphide. Two condensers 45, 46, with collecting tanks 47, 48, are provided. Liquor from the tank 12 is supplied to the column 43, from which it passes to the still 41. The stronger ammonia solution from the tank 48 is passed to the scrubber 8 and the weaker solution from the tank 47 to the scrubber 9. Liquor from the tank 6 is used in scrubber 10 and column 44, and water in scrubber 11. The washing liquor passes through the scrubbers in counter-current to the gas. The gas from the column 44 is passed through a pipe 58 to the saturator 61 to remove the last traces of ammonia, and the gases containing hydrogen sulphide are passed to a sulphuric acid plant 65.



147,583

147,658. LITHOPONES. Veuve M. J. I. de Coppet (representative of J. de Coppet), France. International Convention date, September 11, 1916.

Zinc hydroxide is heated to 90°-100°C. and treated with sodium sulphide to produce hydrated zinc sulphide. The caustic soda obtained is used to obtain the zinc hydroxide from zinc sulphate. The caustic soda is purified periodically. The sodium sulphate obtained from the zinc sulphate is used to prepare barium sulphate and sodium sulphide from barium sulphide, which is obtained by reduction of the sulphate with carbon. The hydrated zinc sulphide is washed, dried, and heated with sulphur to 450°-500°C. The ingredients of lithopone are thus obtained by a continuous process from zinc sulphate, barium sulphate and carbon.

147,711. HYDROFLUORIC ACID. Verein Chemischer Fabriken Mannheim, Wohlgelegen, Mannheim, Germany. International Convention date, December 27, 1918.

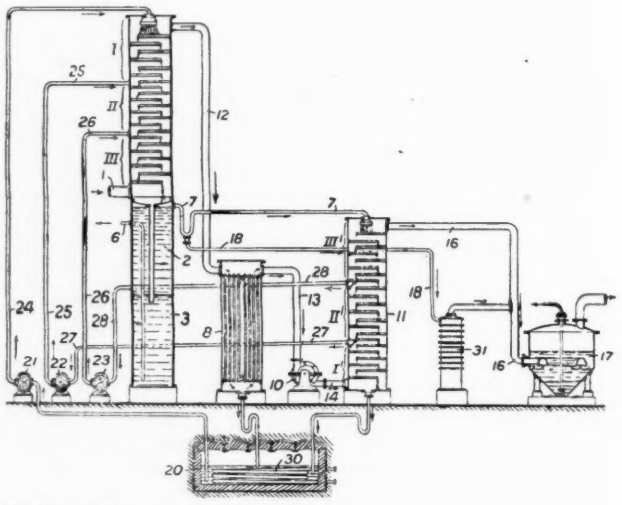
A mixture of sulphuric acid, fluorspar and finely ground anhydrous calcium sulphate is heated to 220°-300° in a muffle furnace of the Mannheim sulphate type. The process is continuous and handling of the calcium sulphate charged with hydrofluoric acid is avoided. The hydrofluoric acid may be absorbed by alkalies.

147,737. COKE OVEN AND LIKE GASES, RECOVERING CONSTITUENTS OF. Firm of C. Still, Recklinghausen, Westphalia, Germany. International Convention date, November 1, 1918.

The gas is compressed to 20-30 atmospheres and treated with alcohol to remove partly carbon monoxide, hydrogen sulphide and methane. The gas is then compressed to 100-200 atmospheres when ammonia separates, and then washed with ammoniacal cuprous chloride to remove carbon monoxide and cyanogen. Benzene hydrocarbons are then removed by washing, and acetylene and ethylene hydrocarbons by sulphuric acid. Details of the plant and process are given.

147,736. AMMONIUM SULPHATE. Firm of C. Still, Recklinghausen, Westphalia, Germany. International Convention date, December 3, 1915. Addition to 28,072/1912.

Distillation gas enters the cooler 2 at 1 and passes upwards in counter current to cooling water introduced at the top from the tank 20. Additional water is supplied by pumps 22, 23, to the zones II. and II. Tar is drawn off from the condensate at 6, and water at 7 to the top of the heater 11. Cooled gas passes through the pipe 12, cooler 8, and pipe 13 to the bottom of the heater 11. Water is drawn off from the hottest zone III′ by a pipe 28, and similarly from the zones I′ and II′, so that the coolest zone I receives least water. The gas then passes to the saturator 17.



147,736

147,747. HYDROGENATING NAPHTHALENE. G. Schroeter, 56, Luisenstrasse, Berlin, and Tetralin Ges., 5, Behrenstrasse, Berlin. International Convention date, August 1, 1916. Addition to 147,580. (*See* above.)

Commercial naphthalene is dissolved in an organic solvent, such as tetrahydronaphthalene and treated with metallic sodium at 150°-200° to purify it. The purified naphthalene in solution, after distillation from the residue, is treated with hydrogen in presence of a catalyst. Instead of sodium, the other purifying materials mentioned in 147,580 may be used.

147,752. WHITE LEAD. W. P. Thompson, 12, Church Street, Liverpool. International Convention date, October 13, 1914.

A current of air, carbon dioxide, acetic acid vapour and water vapour at 26°-60°C. is passed over anhydrous litharge which is kept agitated. The litharge is not melted. White lead is withdrawn periodically from the mixing chamber.

LATEST NOTIFICATIONS.

151,974. Acid-proof castings. Terrisse, H., and Levy, M. September 27, 1919.
151,925. Decomposing heavy hydrocarbon oils into lighter oils. George, R. D. September 30, 1919.
151,984. Production of ammonia from cyanides during heating in the presence of water. Thorssell, C. T., and Lundru, H. L. R. October 6, 1919.
151,952. Recovery of lead and silver from sulphide ores and metallurgical products. Amalgamated Zinc (de Bavay's), Ltd. October 3, 1919.
151,989. Granulating and coating calcium cyanamide. Soc. L'Azote Francais. October 4, 1919.

Specifications Accepted, with Date of Application

130,969, 130,970. Esters, Apparatus for the production of. U.S. Industrial Alcohol Co. August 7, 1918.
141,666. Pure alkaline aluminates, Process for the preparation of. Rochette Freres. April 16, 1919.
151,314. Rotary machines for treating air or gases with liquids and vice versa. W. J. Bulgin, E. A. Hall and G. Searle. May 24, 1919.
151,339. Alkali silicates, Manufacture of readily soluble. F. J. Phillips and E. J. Rose. June 19, 1919.
151,344. Raw rubber, Treatment of, when freshly coagulated from the latex. S. C. Davidson. June 20, 1919.
151,422. Gold-coloured sulphurs and vermillions of antimony, Manufacture of. P. Chaillaux. August 1, 1919.
151,440. Pulverisers. A. E. Davis. August 16, 1919.
151,443. Gas-cleaning apparatus. J. F. Wells. August 20, 1919.
151,445. Gas producers. O. E. Yeo. August 21, 1919.
151,463. Naphthalene from gas obtained by the distillation of coal, Process and apparatus for the complete extraction of. D. Marbais and C. Deguide. September 13, 1919.

Applications for Patents.

Atmosterol, Ltd. Sterilisation, disinfection, &c. 28,102. October 4.
Badische Anilin & Soda Fabrik. Manufacture of alcohols, ketones, &c. 28,657. October 9.
Barrett Co. Process of purifying chemical compounds. 28,472. October 7.
,, Manufacture of oxidation products of naphthalene. 28,473. October 7.
Bedford, Sir C. H. Manufacture of alcohol. 28,352. October 6.
Bitterlings, C. F. A. (Bitterlings, Ltd.) Fertilisers. 28,158. October 5.
Blagden, J. W. Manufacture of calcium, magnesium and lithium acetylsalicylates. 28,343. October 6.
Blanc, G. A. Treatment of leucitic rocks for rendering available the potash contained therein. 28,295. October 6. (Italy, October 6, 1919.)
Burmah Oil Co. Manufacture of alcohol. 28,352. October 6.
Chemische Fabriken Worms, Akt.-Ges. Tanning hides. 28,247. October 5.
Chown, J. A. Carbonisation, distillation and briquetting of carbonaceous material. 28,676. October 9.
Clark, W. (*Chemische Fabriken Worms Akt.-Ges.*). Tanning hides. 28,247. October 5.
Collins, J. J. Purification of zinc chloride. 28,551. October 8.
Dawson, W. H. Manufacture of leuco alizarin bordeaux and derivatives thereof. 28,376. October 7.
Dreyfus. H. Manufacture of cellulose derivatives. 28,350. Oct. 6.
Hamilton, H. J. E. Treatment of sulphide and oxidised ores. 28,539. October 8. (Australia, October 8, 1919.)
Howards & Sons. Manufacture of calcium, magnesium and lithium acetylsalicylates. 28,343. October 6.
Johnson, J. Y. (*Badische Anilin & Soda Fabrik*). Manufacture of alcohols, ketones, &c. 28,657. October 9.
Jourdan, F. Treatment of leucitic rocks for rendering available the potash contained therein. 29,295. October 6. (Italy, Oct. 6, 1919.)
Kestner Evaporator & Engineering Co., Fraymouth, W. A. and Reavell, J. A. Extraction of soluble matter from powdered material, &c., other than tanstuffs. 28,173. October 5.
,, Extraction of tanning from tanstuffs. 28,174. October 5.
,, Treatment of powdered, &c., tanstuffs. 28,175. October 5.
Lyman, E. Fertilisers. 28,158. October 5.
Naef, E. E. Manufacture of metals from their sulphides. 28,139. October 5.
Nouvelle, A. Production of aluminium and zinc salts. 28,326. October 6.
Oldbury Electro-Chemical Co. Manufacture of oxalates and oxalic acid. 28,356. October 6. (United States, March 23.)
Pease, E. L. Extraction of ammonia from fluids, production of material therefor, and production of ammonia, &c., compounds. 28,341. October 6.
Radcliffe, J. Dyeing artificial silk. 28,412. October 7.
,, Production of cellulose acetate, and artificial silk therefrom. 28,413. October 7.
Soc. l'Azote Francais. Process for granulating and coating calcium cyanamide. 28,059. October 4. (France, October 4, 1919.)
,, Recovering nitrous vapours in form of aqueous nitric acid. 28,347. October 6. (Switzerland, October 8, 1919.)
Thermal Industrial & Chemical (T.I.C.) Research Co. Manufacture of coal gas. 28,344. October 6.
Wade, H. (*Barrett Co.*). Process of purifying chemical compounds. 28,472. October 7.
,, (,,) Manufacture of oxidation products of naphthalene. 28,473. October 7.
Wallis, R. L. M. Sterilisation, disinfection, &c. 28,102. October 4.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIALS.	REF. NO.
Spain (Canary Islands).	Chemical manures; fertilisers ...	473
Melbourne ...	Aniline dyes; gums; varnishes; mineral and vegetable oils.	444
Peru	Industrial chemicals; paints; linseed oil.	483
New Zealand .	Heavy chemicals.	458
Uruguay ...	Glass; glue; oils; chemicals. Replies to the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1.	—
Central America	Drugs; chemicals; glassware ...	486
British India .	Glassware; colours; paints; varnishes; soap.	445
Melbourne ...	Shellac; dry colours	445
Ontario ...	Glassware	453
British West Indies	Paints; varnishes; soap	462
San Francisco	Ores; minerals	476
Rio de Janeiro	Light chemicals; raw jute ...	479
Buenos Aires ...	Soaps	482
Shanghai ...	Drugs	518
Valparaiso ...	Heavy and light chemicals; dyes and anilines.	520
Lisbon ...	Chemicals; calicoes for printing...	
South Africa...	Linseed oil: 17,300 gallons of raw linseed oil and 25,000 gallons of double boiled linseed oil. Tenders received by the Secretary to the Tender Board, South African Railway Headquarters Offices, Johannesburg.	514

Books Received

REMOVAL OF THE LIGHTER HYDROCARBONS FROM PETROLEUM BY CONTINUOUS DISTILLATION. By J. M. Wadsworth. Washington Bureau of Mines. Pp. 162. 50 cents.

EXPERIMENTAL STATIONS OF THE BUREAU OF MINES. By Van H. Manning. Washington Bureau of Mines. Pp. 106. 25 cents.

THE PRINCIPLES OF THE PHASE THEORY. By Douglas A. Glibbens. London: Macmillan & Co., Ltd. Pp. 382. 25s. net.

At the annual meeting of the Pharmaceutical Society of Ireland the result of the ballot for the election of seven members on the council was announced. The following were declared elected: Messrs. J. Culbert (Belfast), G. A. M'Lean Lee (Dublin), W. F. Wells (Dublin), G. D. Beggs, J.P. (Dublin), J. E. Connor (Newry) and T. F. Storey (Belfast). All the candidates elected, with the exception of Mr. Culbert and Mr. Storey, were members of the council who retired by rotation.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co. and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

Market Report

THURSDAY, October 14.

The markets remain in an unsettled condition due to the general absence of demand and to the forced realisation of stocks on the part of weak holders. Some low prices, which are said to have been taken, do not appear to be justified, taking into account the cost of production. It is highly probable that an improvement in general trade conditions will very quickly react upon all prices.

The export market continues to be slow, as similar conditions prevail overseas.

General Chemicals

ACETONE is a firm market, price unchanged.

ACID ACETIC.—Only a moderate business is passing at recent values.

ACID CARBOLIC is very slow and is rather easier in tone.

ACID CITRIC.—There is no change to report.

ACID FORMIC maintains its firmer tone and the article passes steadily into consumption.

ACID OXALIC.—Only a small business is reported.

ACID TARTARIC.—Liquidation of stocks continue and the price is rather easier.

BLEACHING POWDER remains scarce for export, makers are not offering.

COPPER SULPHATE.—Business is still hampered by exchange difficulties, but on the whole the article exhibits a healthier tendency.

FORMALDEHYDE is only in very small enquiry and the market is governed at the moment by second-hands.

LEAD SALTS.—There is no improvement in demand and business is nominal.

POTASSIUM PRUSSIATE is scarce for early delivery and the price is again harder.

SODA CAUSTIC.—Parcels are still being realised by second-hands and the price is easy.

SODA BICHROMATE.—Only a moderate business is passing. Value unchanged.

SODA NITRITE is slow of sale but unchanged in price.

SODA PHOSPHATE is a little easier in price and a moderate business is passing.

SODA PRUSSIATE.—Nothing is offered in first hands for immediate delivery and the second-hand price has improved.

ZINC SALTS are quiet and uninteresting.

Coal Tar Intermediates

There is no change to report since our last issue. Business is still on the slow side and prices are inclined to be easier.

ALPHA NAPHTHOL.—Some enquiry has been received for this article from the Continent.

BETA NAPHTHOL is unchanged with foreign material offering.

NITRO BENZOL is in fair demand at recent prices.

PARANITRANILINE is still scarce although the price is slightly easier.

RESORCIN.—There is considerable enquiry for this material and small business is being transacted.

Coal Tar Products

There is little change in our market.

90's BENZOL.—Notwithstanding the fall in the price of petrol, benzol remains firm at 3s. 10d. to 3s. 11d. on rails in the North, and about 4s. in the South.

PURE BENZOL is worth about 4s. 2d. to 4s. 3d. and seems to be more plentiful.

CREOSOTE OIL remains unchanged at 1s. 1d. to 1s. 1½d. in the North and 1s. 2d. to 1s. 2½d. in the South.

CRESYLIC ACID is slightly more active and prices are 3s. 10d. to 4s. for Dark, 95/97 per cent., with 4s. 6d. to 4s. 9d. for Pale 97 99 per cent.

SOLVENT NAPHTHA is not worth more than 3s. on rail.

HEAVY NAPHTHA is showing signs of weakening and is worth about 3s. 3d. to 3s. 4d.

NAPHTHALENE.—Crude qualities are selling at £14 to £24 per ton, while Refined remains weak at about £50 per ton.

PITCH.—There is no change to report. The demand has fallen off somewhat, but prices are well maintained.

Sulphate of Ammonia

Remains unchanged.

Current Prices

Chemicals

	per	£	s	d.		£	s	d.
Acetic anhydride	lb.	0	3	9	to	0	4	0
Acetone oil	ton	90	0	0	to	95	0	0
Acetone, pure	ton	120	0	0	to	125	0	0
Acid, Acetic, glacial, 99-100%	ton	105	0	0	to	110	0	0
Acetic, 80% pure	ton	82	10	0	to	85	0	0
Arsenic	ton	100	0	0	to	105	0	0
Boric, cryst.	ton	74	10	0	to	76	0	0
Carbolic, cryst. 39-40%	lb.	0	0	11½	to	0	1	0
Citric	lb.	0	4	3	to	0	4	6
Fluoric	lb.	0	0	7½	to	0	0	8
Formic, 80%	ton	115	0	0	to	120	0	0
Gallic, pure	lb.		7	3	to	0	7	6
Hydrofluoric	lb.	0	0	8½	to	0	0	9
Lactic, 50 vol.	ton	58	0	0	to	60	0	0
Lactic, 60 vol.	ton	67	10	0	to	70	0	0
Nitric, 80 Tw.	ton	41	0	0	to	44	0	0
Oxalic	lb.	0	2	3	to	0	2	4
Phosphoric, 1.5	ton	65	0	0	to	67	0	0
Pyrogallic, cryst	lb.	0	11	6	to	0	11	9
Salicylic, Technical	lb.	0	2	3	to	0	2	6
Salicylic, B.P.	lb.	0	2	11	to	0	3	0
Sulphuric, 92-93%	ton	8	10	0	to	8	15	0
Tannic, commercial	lb.	0	3	6	to	0	3	9
Tartaric	lb.	0	3	0	to	0	3	1
Alum, lump	ton	19	10	0	to	20	0	0
Alum, chrome	ton	88	0	0	to	90	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	17	10	0	to	18	10	0
Aluminium, sulphate, 17-18%	ton	20	10	0	to	21	10	0
Ammonia, anhydrous	lb.	0	2	2	to	0	2	4
Ammonia, .880	ton	43	0	0	to	45	0	0
Ammonia, .920	ton	30	0	0	to	32	10	0
Ammonia, carbonate	lb.	0	0	7½	to	—		
Ammonia, chloride	ton	95	0	0	to	100	0	0
Ammonia, muriate (galvanisers)	ton	60	0	0	to	65	0	0
Ammonia, nitrate	ton	55	0	0	to	60	0	0
Ammonia, phosphate	ton	120	0	0	to	125	0	0
Ammonia, sulphocyanide	lb.	0	3	0	to	0	3	3
Amyl acetate	ton	420	0	0	to	425	0	0
Arsenic, white, powdered	ton	76	0	0	to	78	0	0
Barium, carbonate, 92-94%	ton	12	10	0	to	13	0	0
Barium, chlorate	lb.	0	0	11	to	0	1	0
Chloride	ton	28	0	0	to	29	0	0
Nitrate	ton	55	0	0	to	56	0	0
Barium Sulphate, blanc fixe, dry	ton	30	0	0	to	31	0	0
Sulphate, blanc fixe, pulp	ton	16	10	0	to	17	0	0
Sulphocyanide, 95%	lb.	0	1	6	to	0	1	8
Bleaching powder, 35-37%	ton	31	0	0	to	32	0	0
Borax crystals	ton	41	0	0	to	42	10	0
Calcium acetate, Brown	ton	20	0	0	to	21	0	0
,, Grey	ton	34	0	0	to	35	10	0
Calcium Carbide	ton	30	0	0	to	32	0	0
Chloride	ton	10	10	0	to	11	10	0
Carbon bisulphide	ton	65	0	0	to	67	0	0
Casein, technical	ton	75	0	0	to	80	0	0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	2	to	0	1	4
Cobalt acetate	lb.	0	8	6	to	0	9	0
Oxide, black	lb.	0	10	0	to	0	10	3
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	42	0	0	to	44	0	0
Cream Tartar, 98-100%	ton	245	0	0	to	250	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol.	ton	305	0	0	to	310	0	0

	per	£	s.	d.		£	s.	d.
Formusol (Rongalite)	lb.	0	4	9	to	0	5	1
Glauber salts	ton	Nominal.						
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	9	to	0	2	10
Iron perchloride	ton	50	0	0	to	52	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	82	10	0	to	85	0	0
Carbonate (White Lead)	ton	65	0	0	to	67	10	0
Nitrate	ton	65	0	0	to	67	0	0
Litharge	ton	57	0	0	to	59	0	0
Lithopone, 30%	ton	48	0	0	to	49	0	0
Magnesium chloride	ton	15	10	0	to	16	10	0
Carbonate, light	cwt	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	12	10	0	to	13	0	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Manganese, Borate	ton	190	0	0	to	—		
Sulphate	ton	130	0	0	to	135	0	0
Methyl acetone	ton	95	0	0	to	100	0	0
Alcohol, 1% acetone	gall.	Nominal.						
Nickel sulphate, single salt	ton	60	0	0	to	62	0	0
Nickel ammonium sulphate, double salt	ton	62	0	0	to	64	0	0
Potassium bichromate	lb.	0	1	8	to	0	1	9
Carbonate, 90%	ton	115	0	0	to	120	0	0
Chloride	ton	50	0	0	to	52	0	0
Chlorate	lb.	0	0	9½	to	0	0	10½
Meta bisulphite, 50-52%	ton	260	0	0	to	270	0	0
Nitrate, refined	ton	65	0	0	to	67	0	0
Permanganate	lb.	0	4	3	to	0	4	6
Prussiate, red	lb.	0	4	0	to	0	4	3
Prussiate, yellow	lb.	0	2	0	to	0	2	1
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt.	5	10	0	to		—	
Seconds	cwt.	5	5	0	to		—	
Sodium acetate	ton	55	0	0	to	56	0	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	1	4	to	0	1	5
Bisulphite, 60-62%	ton	50	0	0	to	52	10	0
Chlorate	lb.	0	0	5½	to	0	0	5½
Caustic, 70%	ton	32	0	0	to	33	0	0
Caustic, 76%	ton	34	10	0	to	35	0	0
Hydrosulphite, powder, 85%	lb.	0	4	6	to	0	4	10
Hyposulphite, commercial	ton	35	10	0	to	37	10	0
Nitrite, 96-98%	ton	87	10	0	to	90	0	0
Phosphate, crystal	ton	47	0	0	to	49	0	0
Perborate	lb.	0	2	2	to	0	2	4
Prussiate	lb.	0	1	2½	to	0	1	3½
Sulphide, crystals	ton	30	0	0	to	32	0	0
Sulphide, solid, 60-62%	ton	52	10	0	to	55	0	0
Sulphite, cryst	ton	15	10	0	to	16	10	0
Strontium carbonate	ton	85	0	0	to	90	0	0
Nitrate	ton	90	0	0	to	95	0	0
Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	19	0	0	to	19	10	0
Roll	ton	19	0	0	to	19	10	0
Tartar emetic	lb.	0	3	0	to	0	3	2
Tin perchloride, 33%	lb.	0	2	6	to	0	2	7
Perchloride, solid	lb.	0	3	0	to	0	3	3
Protochloride (tin crystals)	lb	0	2	0	to	0	2	1
Zinc chloride, 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	60	0	0	to	65	0	0
Oxide, 99%	ton	72	10	0	to	75	0	0
Oxide, 94-95%	ton	60	0	0	to	62	10	0
Dust, 90%	ton	90	0	0	to	92	10	0
Sulphate	ton	21	10	0	to	23	10	0

Coal Tar Intermediates, &c.

	per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	4	0	to	0	4	3
Alphanaphthol, refined	lb.	0	5	6	to	0	5	9
Alphanaphthylamine	lb.	0	3	9	to	0	4	0
Aniline oil, drums extra	lb.	0	1	8	to	0	1	9
Aniline salts	lb.	0	1	10	to	0	2	0
Anthracene, 85-90%	lb.		—		to		—	
Benzaldehyde (free of chlorine)	lb.	0	5	9	to	0	6	0
Benzidine, base	lb.	0	13	6	to	0	14	0
Benzidine, sulphate	lb.	0	10	6	to	0	11	0
Benzoic acid	lb.	0	5	3	to	0	5	6
Benzoate of soda	lb.	0	5	3	to	0	5	6
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	1	6	0	to	1	7	6
Betanaphthol	lb.	0	4	9	to	0	5	0
Betanaphthylamine, technical	lb.	0	11	6	to	0	12	6
Croceine Acid, 100% basis	lb	0	5	0	to	0	6	3
Dichlorbenzol	lb.	0	0	6	to	0	0	7
Diethylaniline	lb.	0	7	9	to	0	8	6
Dinitrobenzol	lb.	0	1	4	to	0	1	5
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	6	to	0	1	8
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	2	9	to	0	3	0
Dimethylaniline	lb.	0	5	9	to	0	6	0
Diphenylamine	lb.	0	5	0	to	0	5	3
H-Acid	lb.	0	14	6	to	0	15	0
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	6
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	5	6	to	0	6	0
Naphthionate of Soda	lb.	0	6	0	to	0	6	3
Naphthylamin-di-sulphonic-acid	lb.	0	5	6	to	0	6	6
Nitronaphthaline	lb.	0	1	6	to	0	1	8
Nitrotoluol	lb.	0	1	3	to	0	1	4
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	1	to	0	1	2
Orthotoluidine	lb.	0	2	6	to	0	2	9
Orthonitrotoluol	lb.	0	1	3	to	0	1	4
Para-amidophenol, base	lb.	0	12	6	to	0	13	0
Para-amidophenol, hydrochlor	lb	0	13	0	to	0	13	6
Paradichlorbenzol	lb.	0	0	6	to	0	0	8
Paranitraniline	lb.	0	8	0	to	0	8	3
Paranitrophenol	lb.	0	2	9	to	0	3	0
Paranitrotoluol	lb.	0	5	9	to	0	6	0
Paraphenylenediamine, distilled	lb.	0	13	6	to	0	14	6
Paratoluidine	lb.	0	8	6	to	0	9	6
Phthalic anhydride	lb.	0	4	9	to	0	5	0
R. Salt, 100% basis	lb.	0	4	0	to	0	4	2
Resorcin, technical	lb.	0	11	6	to	0	12	6
Resorcin, pure	lb.	0	17	6	to	0	18	0
Salol	lb.	0	5	3	to	0	5	9
Shaeffer acid, 100% basis	lb.	0	3	6	to	0	3	0
Sulphanilic acid, crude	lb.	0	1	8	to	0	1	9
Tolidine, base	lb.	0	10	6	to	0	11	6
Tolidine, mixture	lb.	0	3	0	to	0	3	6

Alsatian Potash

LARGE supplies of muriate of potash are now coming forward from the Alsatian mines. Prices quoted by the importers and manure merchants for muriate of potash as well as for French kainit and French potash salts are favourable.

Science Congress in Hobart

THE fifteenth meeting of the Australasian Association for the Advancement of Science will be held in Hobart in January, and will, it is believed, be the most important for many years, since the point of view of the public towards science, and of Australasian scientific men and women has been modified by the events of the last few years. The meeting will be largely taken up in the discussion of broad scientific questions, particularly those with an Australian aspect, and delegates and members will be present from wide fields. The president is Professor David, and the president-elect Professor Sir Baldwin Spencer, while distinguished men have been chosen as presidents of sections. Other scientific bodies are arranging their meetings at the same time.

Institute of Metals

MR. G. SHAW SCOTT, secretary of the Institute of Metals, has issued the syllabus of the Institute for the new session. In the Scottish Local Section the session will open in Glasgow on Wednesday, October 27, with an address by Lord Weir on "Some Notes on Foundries and Production." Other papers will include "Fuel," by Mr. J. A. C. Edmiston; "Rolling and Extrusion," by Mr. S. E. Black; and "Aluminium, Production and Uses," by Mr. G. H. Bailey, D.Sc., while there will also be a discussion on "Furnaces" opened by Messrs. J. Stirling and J. Arnott, and an address at the annual general meeting by Mr. James Steven.

The Affairs of Phineas Keats

THE public examination of Philip Phineas Keats, chemist, 167, Mary Street, Balsall Heath, Birmingham, was held on Wednesday, October 6, at Birmingham, before Mr. Registrar Whitelock. Mr. A. S. Cully (Official Receiver) applied for an adjournment, and stated that the debtor had been committed to the assizes for trial on a criminal charge, and the public examination involved the going into of some of the matters which were the subject of the charge preferred against him. The examination was adjourned.

Company News

PORCO TIN MINES.—The accounts for 1919 show a total loss of £8,693.

SPANISH RIVER PULP AND PAPER MILLS.—A dividend has been declared of 1¾ per cent. on common stock for the quarter ending September 30.

BURMAH OIL.—The directors announce an interim dividend on the ordinary shares of 2s. per share, equivalent to 20 per cent. per annum, to June 30 last, free of tax.

CANADIAN EXPLOSIVES.—A dividend has been declared of 1¾ per cent. on the 7 per cent. cumulative preferred shares for the quarter ended September 30, payable on October 15.

BORAX CONSOLIDATED.—A dividend has been declared at the rate of 6 per cent. per annum, less tax, on the preferred ordinary shares for the half-year ended September 30. Last year the dividend was the same.

EASTERN CHEMICAL.—The net profit for the year ending March 31 amounts to £7,453, and £12,522 was brought in, making £19,975. The directors recommend a dividend of 10 per cent. on the ordinary shares, less tax.

BRYANT & MAY.—An interim dividend has been declared of 4 per cent., free of tax, on the ordinary and partnership shares for the half-year ended September 30, payable November 1. A year ago the dividend was the same.

TAYLOR'S DRUG COMPANY.—At the annual meeting of shareholders in Leeds, on Monday, a dividend of 10 per cent. for the past year on the ordinary shares, and bonuses of 5 per cent. on the ordinary shares, 1 per cent. on preference shares, and 1 per cent. on debentures were authorised.

DOMINION STEEL.—Dividend No. 35 at the rate of 1½ per cent. on the preference shares, payable November 1. Coupon No. 35 relating to share warrants will be paid on and after November 1 on presentation at the office of the Canadian Bank of Commerce, 2, Lombard-Street, E.C. 3.

VIRGINIA CAROLINA CHEMICAL.—The 100th consecutive quarterly dividend of 2 per cent. ($2 per share) has been declared on the preferred stock payable on October 15, and a dividend of 1 per cent. ($1 per share), being dividend No. 55, on the common stock, payable on November 1.

LEVER BROTHERS, LTD.—In order to provide for capital expenditure incurred in connection with the business of the company and certain of its associated companies, the directors are inviting subscriptions this week for 8 per cent. cumulative "A" preference shares of £1 each at par up to, but not exceeding, 4,000,000 shares. Applications from shareholders and customers of the company will receive special consideration.

GLENBOIG UNION FIRE CLAY.—The net profit for three years ended August last, including £22,579 brought in from 1917, was £76,472. After deducting interim dividends paid in October, 1918 and 1919, the available balance is £38,847. The directors propose that interim dividends be declared for the years named, and further recommend a dividend at the rate of 20 per cent., less tax, leaving £17,847 to carry forward.

W. H. DORMAN & CO.—The report of W. H. Dorman & Co. for the year ended July 21, states that the net profit after providing for all expenses, excess profits duty, and corporation profits tax, amounted to £72,890 (against £110,186 in the previous year), to which is added £27,376 brought forward. The fixed dividend on the preference shares has been paid to June last, and absorbed £5,364, leaving a disposal balance of £94,993. The whole of the expenses incurred in the capital issue of December last, amounting to £17,874, have been written off. It is proposed to pay a dividend on the preference shares at the rate of 8 per cent. per annum, less tax, up to and including July 31 last, with an additional 1 per cent. for the year under review; also a dividend on the ordinary shares for the year at the rate of 12 per cent. per annum, less tax. These dividends are payable on December 1, and there will be paid on that date a further four months' dividend on the preference shares, then due, at the rate of 8 per cent. per annum, in order that the dividends on the ordinary shares may coincide in future with the dates on which the preference dividends are paid. The balance to be carried forward is £43,947. In the previous year an interim dividend of 10 per cent., free of tax, was paid, on the capital then amounting to £965,691, and £33,138 was capitalised by the distribution of one new share fully paid for every five shares held.

September Trade Returns

THE sharp decline in exports for August from the record figures of July was followed by a slight recovery in September, the increase amounting to over £2,500,000. Imports, on the other hand, fell by a further £562,000, and with re-exports practically stationary, the adverse balance of trade has been reduced from £24,982,000 in August to £21,885,000 last month. Since the beginning of the year the difference between imports and exports has fluctuated considerably, but the tendency over the whole period has been steadily downward, and it may be said with confidence that a substantial advance has been made towards the replacing of our overseas trade on a sound basis.

The imports for the month amounted to £152,692,339, an increase of £4,103,767 on September 1919; exports, £117,455,913, an increase of £50,955,285; re-exports, £13,359,608, a decrease of £2,393,070.

The following figures show the large increase in the imports of dyestuffs and intermediate products from January to August this year. The official figures do not show the source from which these imports come, but it is probable that a very large proportion of them come from Germany :—

Dyestuffs.		Intermediate Products.	
Cwts.	£	Cwts.	£
9,511	317,304		
9,194	350,915	1,022	5,829
8,906	313,618	4,168	62,452
7,600	278,891	5,137	67,797
9,774	366,452	2,798	38,795
13,557	511,007	4,742	80,630
13,442	590,863	3,682	58,030
21,758	933,159	7,059	114,180
93,742	3,662,209	28,599	427,713

The value of the chemicals, drugs, dyes and colours imported last month was £3,179,217, an increase over September 1919 of £1,282,205; of oil seeds, nuts, oils, &c., £5,216,087, a decrease of £7,836,189; hides and skins, undressed, £1,519,668, a decrease of £1,099,952; oils, fats and resins, manufactured, £7,723,619, an increase of £3,980,683; leather and manufactures thereof, £1,261,244, a decrease of £3,760,124.

As regards exports, we exported chemicals, drugs, dyes and colours to the value of £3,942,946, as compared with £1,983,759 in 1919; oil seeds, nuts, oils, &c., £836,560, against £918,700; hides and skins, undressed, £86,203, against £25,748; oils, fats and resins, manufactured, £865,149 against £367,634; leather and manufactures thereof, £695,751 against £35,577.

Taking the quantities as distinct from values we exported 7,950 tons of oils, fats, &c., against 19,626 tons in September 1919; china clay, 59,269 tons, against 24,747 tons; coal tar, pitch, 21,170 tons, against 16,312 tons; coke and fuel, 365,806 tons against 285,364 tons; soda compounds, 678,480 cwt., against 445,590 cwt.; dyestuffs, 27,293 cwt., against 11,808 cwt.; painters' colours, 130,569 cwt. against 103,347 cwt.; candles, 9,501 cwt., against 16,376 cwt.; soap 96,170 cwt., against 227,451 cwt.; linoleum, 3,572,800 sq. yds. against 1,867,100 sq. yds.; cement, 50,575 tons, against 28,450 tons.

Canadian Pulp and Paper Exports

THE exports of pulp and paper products from Canada for 1920 were approximately five and a half times the pre-war total, with the annual increase for four years exceeding in each case the total volume of exports in a year as recent as 1913. The growth in summarised in the following figures from the official trade returns :—

Year ending Mar. 31.	Paper and manufactures of	Chemical pulp	Mechanical pulp.
1911	$3,924,452 ...	$1,308,101 ...	$4,407,431
1912	3,885,881 ...	1,587,533 ...	3,506,770
1913	6,341,088 ...	2,100,842 ...	3,408,702
1914	12,690,549 ...	2,923,083 ...	3,441,741
1915	15,500,064 ...	4,806,622 ...	6,801,011
1916	20,042,806 ...	4,459,539 ...	3,575,537
1917	26,107,824 ...	14,032,920 ...	6,371,133
1918	37,865,330 ...	19,131,813 ...	6,487,079
1919	49,165,795 ...	30,226,856 ...	4,479,915
1920	63,253,419 ...	33,000,063 ...	8,383,419

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Notice of Dividend

VILLAIN, PAUL MAURICE (described in the Receiving Order as Paul Villain), 14, Effra Road, Brixton, analytical chemist. 3s. supplemental. Any day (except Saturday) on or after October 20, between the hours of 11 and 2 at Bankruptcy Buildings, Carey Street, London, W.C. 2.

Companies Winding Up Voluntarily

PACIFIC PHOSPHATE CO., LTD., (in voluntary liquidation).—Liquidator, Mr. A. R. Dickinson.

CUBAN PETROLEUM CO., LTD. (company winding up voluntarily).—A meeting of creditors will be held at 242, Finsbury Pavement House, Finsbury Pavement, E.C., on October 20, at 12 noon. Creditors' claims on or before November 16 to Mr. R. D. G. Morris, Liquidator, at the above address.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

RICHMOND GLASS WORKS, LTD., Richmond (Surrey).—Registered October 1, £1,500 debentures (filed under Sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue £1,000; general charge.

Satisfaction

SHERWOOD BLEACHING, DYEING & DRESSING CO., LTD., Sherwood.—Satisfaction registered October 1, £8,000, registered November 11, 1912.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

HENLEY'S, 56, James Street, Devonport, chemical merchants. £46 14s. 8d. August 3.

GLOSSOP, WILLIAM, Hipperholme, tar distiller. £16 11s. 6d. August 26.

JONES, F., 97, Victoria Road, Headingley, Leeds, chemist. £17 5s. 4d. September 3.

New Companies Registered

The following have been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lan , London, W.C. :—

BRITISH OIL CRUSHERS, LTD. Grease refiners. Nominal capital, £1,000 in 1,000 shares of £1 each. Directors to be appointed by subscribers. Qualification of directors, one share. Subscribers: J. C. Bates and A. W. J. Mock.

BURKE (D. J.) & PARTNERS, LTD.—Chemists and druggists. Nominal capital, £2,000 in 2,000 shares of £1 each. Directors: D. J. Burke, E. Newmann. Qualification of directors, 1 share.

GREEN'S PATENT CO., LTD.—Manufacturers of celluloid artificial silk, aeroplane dope, &c. Nominal capital, £5,000 in 2,500 "A" shares and 2,500 "B" shares of £1 each. Directors: F. W. Kerr, P. J. Mitchell, R. Green. Remuneration of directors, £100 each, chairman £150. Subscribers: L. O. C. Hathaway, H. J. Carter.

LAVOS, LTD., 4, Golden Square, W. 1. Soap manufacturers. Nominal capital, £5,000 in 2,500 8 per cent. cumulative preference shares and 2,500 ordinary shares of £1 each. Directors: S. H. Smith and F. C. Buck. Qualification of directors, one share.

Benn Brothers Journals

Some Features of the Current Issues

AERONAUTICS.

"Prizes, Official and Private"; and "Mail Transport." by Major P. L. Holmes.

THE CABINET MAKER.

"The Vindication of the Trade"; "Old Furniture and Environment"; "Commercial Motors and the Furniture Industry."

THE ELECTRICIAN.

"The Crawling of Induction Motors," by L. H. A. Carr; "Electric Traction in Europe and America," by M. Parodi; "The Radio Telegram Station at Rome."

FARM AND HOME.

"Increasing the World's Wheat Yield" (Special article); "The Lincoln Tractor Trials" (Supplementary report); "The Value of Whey," by A. H. Murray.

THE FRUIT-GROWER.

"Apple Packing and Grading"; Wisbech Fruit Show Arrangements (illustrated); and "Railway Rates Inquiry."

GARDENING ILLUSTRATED.

"Potato Disease: Cutting off Haulm"; "Planting Evergreens"; "May Flowering Tulips" (illustrated).

THE GAS WORLD.

"The Truth about the Multi-Cooker," by W. M. Mason: Discussion on the Distribution of Gas; "Regulation of Water Gas Plants."

THE HARDWARE TRADE JOURNAL.

"Railway Fates for Light Castings"; "The Financial Status of Overseas Traders"; "The Electric Lighting of Shop Windows."